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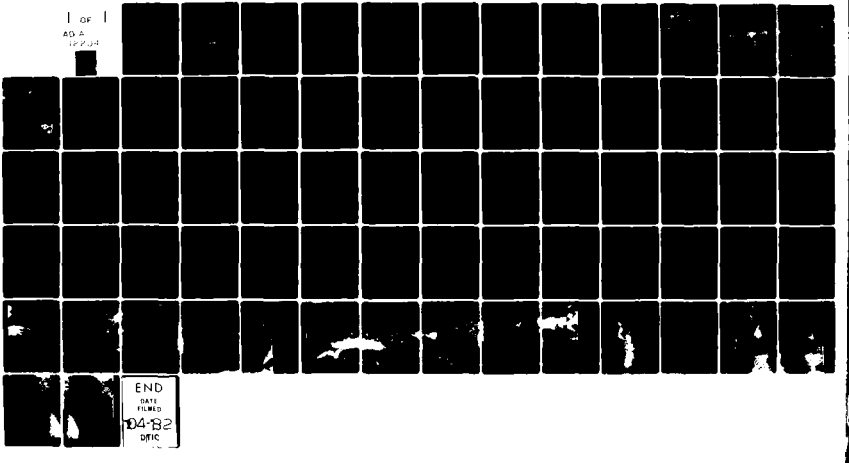

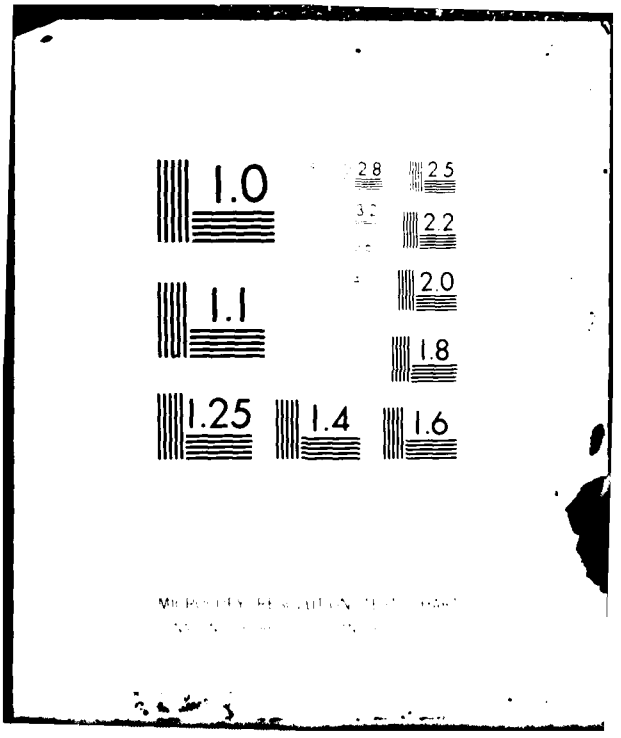
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GRAVITY SURVEY - LAKE VALLEY
NEVADA

Prepared for:

U.S Department of the Air Force
Ballistic Missile Office (BMO)
Norton Air Force Base, California 92409

Prepared by:

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3777 Long Beach Boulevard
Long Beach, California 90807

20 May 1981

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Results of a gravity survey of the Lake Valley of East Central Nevada indicate that the valley is underlain by three subsurface blocks, or grabens. The range in depths to carbonate bedrock along the valley axis is interpreted to be 2000 to 6000 feet. Faults and lineaments in the alluvium indicate Quaternary movement of the northern block.

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FOREWORD

Methodology and Characterization studies during Fiscal Years 1977 and 1978 (FY 77 and 78) included gravity surveys in ten valleys in Arizona (five), Nevada (two), New Mexico (two), and California (one). The gravity data were obtained for the purpose of estimating the gross structure and shape of the basins and the thickness of the valley fill. There was also the possibility of detecting shallow rock in areas between boring locations. Generalized interpretations from these surveys were included in Ertec Western's (formerly Fugro National) Characterization Reports (FN-TR-26a through e).

During the FY 77 surveys, measurements were made to form an approximate 1-mile grid over the study areas, and contour maps showing interpreted depth to bedrock were made. In FY 79, the decision was made to concentrate on verifying and refining suitable area boundaries. This decision resulted in a reduction in the gravity program. Instead of obtaining gravity data on a grid, the reduced program consisted of obtaining gravity measurements along profiles across the valleys where Verification studies were also performed.

The Defense Mapping Agency (DMA), St. Louis, Missouri, was requested to provide gravity data from their library to supplement the gravity profiles. For Big Smoky, Hot Creek, and Big Sand Springs valleys, a sufficient density of library data is available to permit construction of interpreted contour maps instead of just two-dimensional cross sections.

In late summer of FY 79, supplementary funds became available to begin data reduction. At that time, inner zone terrain corrections were begun on the library data and the profiles from Big Smoky Valley, Nevada, and Butler and La Posa valleys, Arizona. The profile data from Whirlwind, Hamlin, Snake East, White River, Garden, and Coal valleys, Nevada, became available from the field in early October 1979.

A continuation of gravity interpretations has been incorporated into the FY 80-81 program, and the results are being summarized in a series of valley reports. Reports covering Nevada-Utah gravity studies are numbered "E-TR-33-" followed by the abbreviation for the subject valley. In addition, more detailed reports of the results of FY 77 surveys in Dry Lake and Ralston valleys, Nevada, were prepared. Verification studies were continued in FY 80 and 81, and gravity studies were included in the program. DMA continued to obtain the field measurements, and there was a return to the grid pattern. The interpretation of the grid data allows the production of contour maps which are valuable in the deep basin structural analysis needed for computer modeling in the water resources program. The

gravity interpretations will also be useful in Nuclear Hardness and Survivability (NH&S) evaluations.

The basic decisions governing the gravity program are made by BMO following consultation with TRW, Inc., Ertec Western, and the DMA. Conduct of the gravity studies is a joint effort between DMA and Ertec Western. The field work, including planning, logistics, surveying, and meter operation is done by the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC), headquartered in Cheyenne, Wyoming. DMAHTC reduces the data to Simple Bouguer Anomaly (see Section A1.4, Appendix A1.0). The Defense Mapping Agency Aerospace Center (DMAAC), St. Louis, Missouri, calculates outer zone terrain corrections.

Ertec Western provides DMA with schedules showing the valleys with the highest priorities. Ertec Western also recommended locations for the profiles in the FY 79 studies with the provision that they should follow existing roads or trails. Any required inner zone terrain corrections are calculated by Ertec Western prior to making geologic interpretations.

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LIST OF DRAWINGS

1.0 INTRODUCTION

1.1 OBJECTIVE

Gravity data from Lake Valley were studied for the purpose of making a geological interpretation which includes estimates of the overall shape of the structural basin, the thickness of alluvial fill, and the location of concealed faults. The estimates will be useful in modeling the dynamic response of ground motion in the basin and in evaluating ground-water resources.

1.2 LOCATION

Lake Valley is located in east-central Nevada about 30 miles (48 km) west of the Utah border and 50 miles (80 km) north of the town of Caliente (Figure 1).

Lake Valley is bounded on the east by the Fortification and Wilson Creek ranges. It is bounded on the west by Schell Creek Range, Dutch John Mountain, Grassy Mountain, Fairview Range, Bristol Range, and Pioche Hills (Figure 2). The valley is approximately 12 miles (19 km) wide and 60 miles (97 km) long. It is principally used for rangeland. U.S. Highway 93 and an extensive network of well-maintained unpaved roads provide access throughout the valley.

The area covered by this report lies between latitudes 38°00' and 38°48' N. and longitudes 114°20' and 114°45' W.

EXPLANATION
AREA COVERED BY THIS REPORT
SCALE 1:2,500,000
STATUTE MILES
KILOMETERS
NORTH
LAKE VALLEY
NEVADA
UTAH
ARIZONA
NEVADA
CALIFORNIA
DELTA
MILFORD
ELY
CALIENTE
AUSTIN
TONOPAH
SEVIER DESERT
DUGWAY VALLEY
FISH SPRINGS FLAT
TULE VALLEY
SNAKE VALLEY
WHIRLWIND VALLEY
HANLIN VALLEY
PINE VALLEY
WAH WAH VALLEY
BUTTE VALLEY
SPRING VALLEY
STEPTOE VALLEY
CAVE VALLEY
MULESHOE VALLEY
DRY LAKE VALLEY
DELAMAR VALLEY
PAHROC VALLEY
COAL VALLEY
GARDEN VALLEY
PENOYER VALLEY
RAILROAD VALLEY
HOT CREEK VALLEY
WHITE RIVER VALLEY
JAKES VALLEY
LONG VALLEY
NEWARK VALLEY
ANTELOPE VALLEY
KOBEH VALLEY
LITTLE SMOKY VALLEY
BIG SAND SPRINGS VALLEY
STONE CABIN VALLEY
MONITOR VALLEY
RALSTON VALLEY
BIG SMOKY VALLEY
REVEILLE VALLEY
RAILROAD VALLEY
NELLIS AIR FORCE RANGE
NEVADA TEST SITE
NELLIS AIR FORCE RANGE
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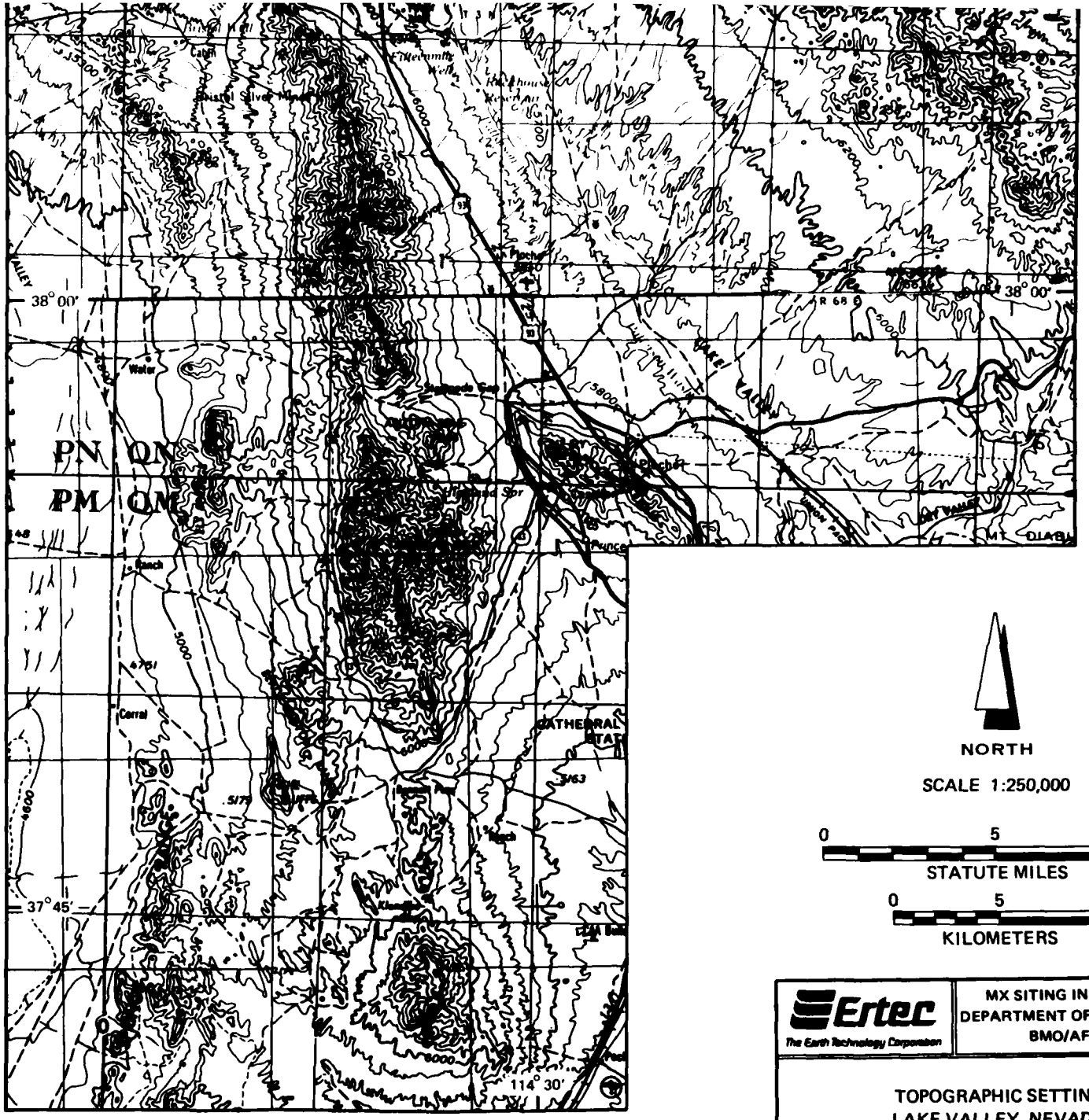
LOCATION MAP
LAKE VALLEY, NEVADA
20 MAY 81
FIGURE 1



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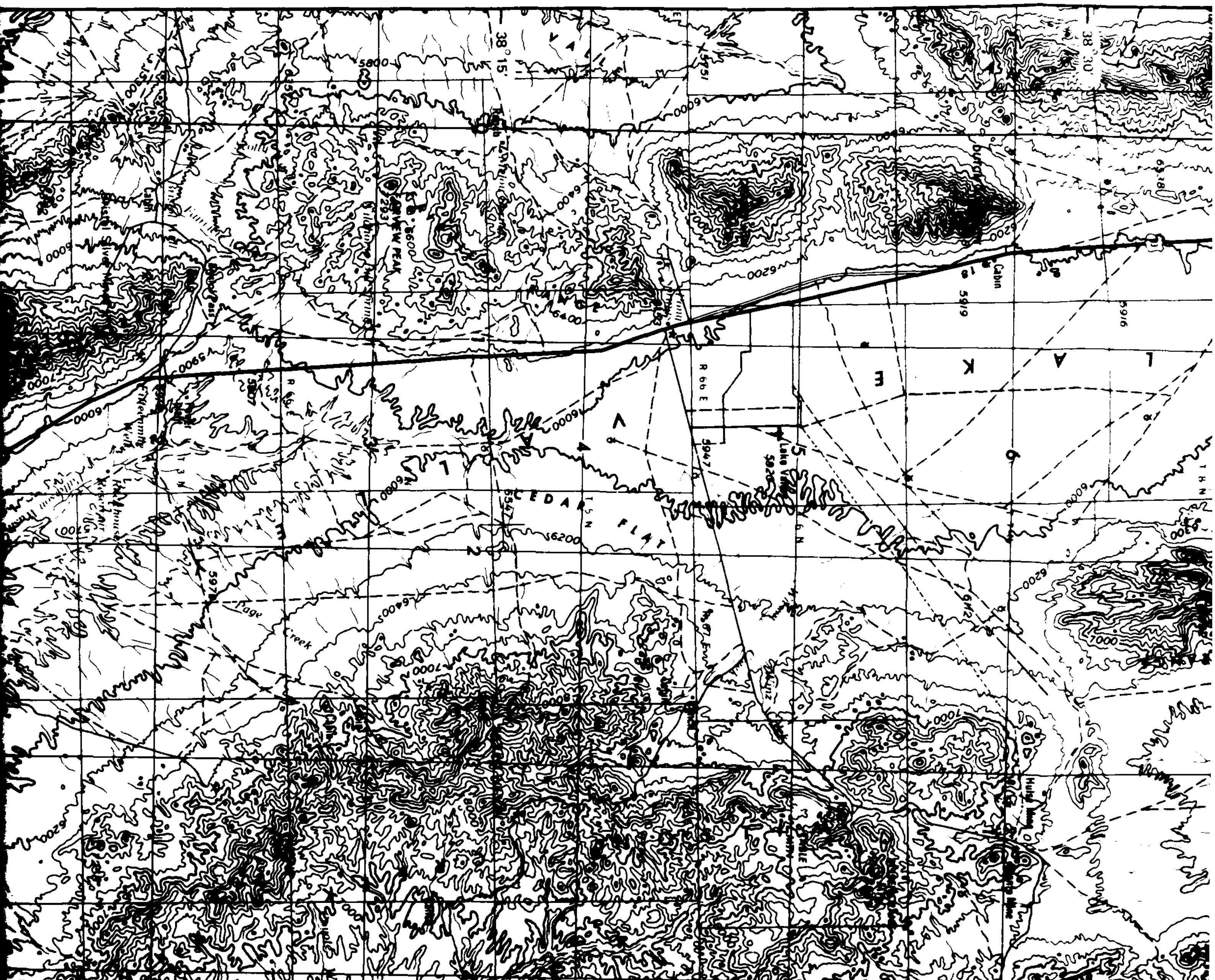
TOPOGRAPHIC SETTING
LAKE VALLEY, NEVADA

20 MAY 81

FIGURE 2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38°30'
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FLAT
Page
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Cabin
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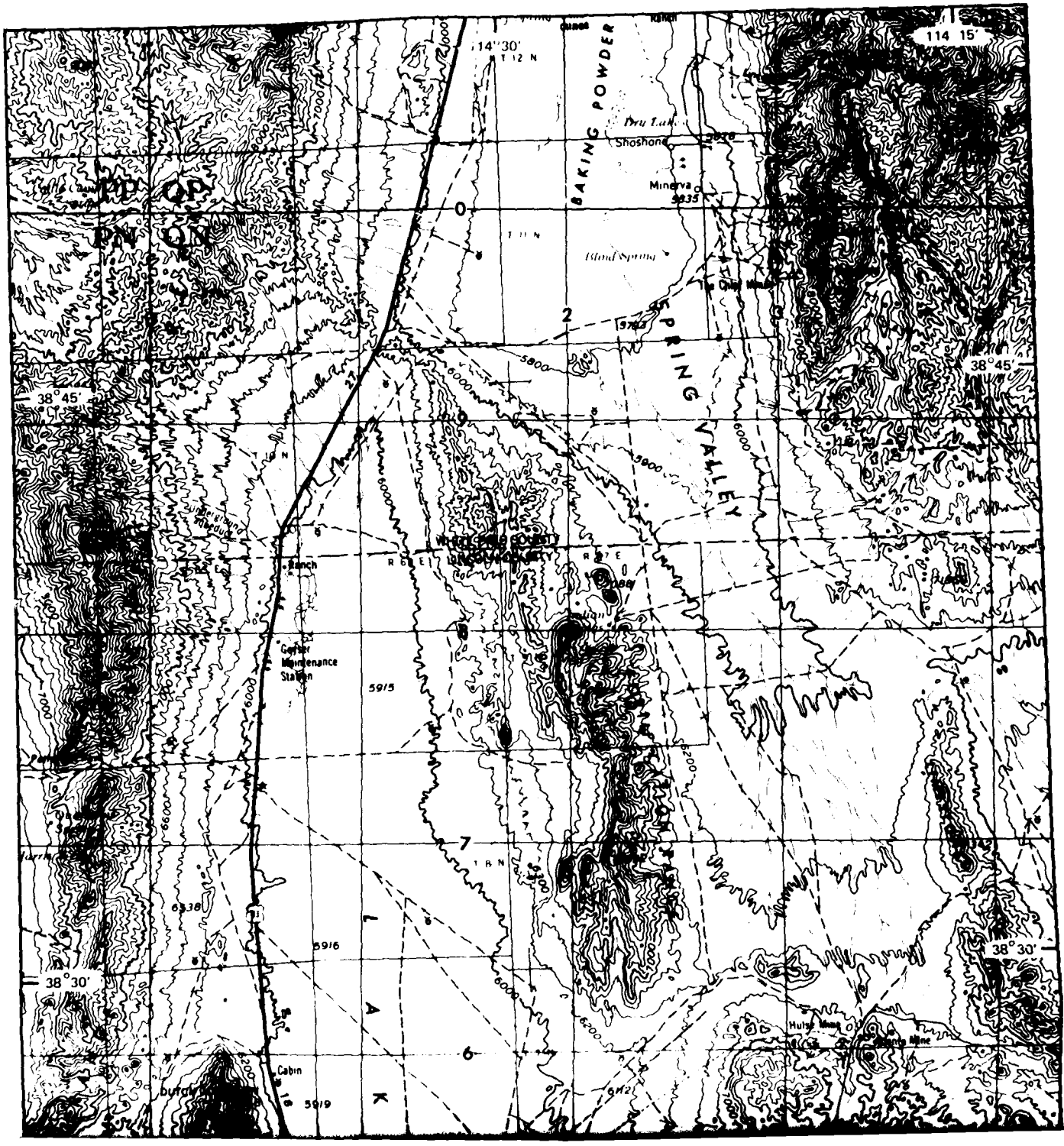

114° 15'
14°30'
T 12 N
BAKING POWDER
Shoshone
Minerva
5935
T 11 N
Blind Spring
SPRING VALLEY
38°45'
38°45'
Ranch
Gerber
Maintenance
Station
5915
7
T 8 N
38°30'
38°30'
5916
6338
Cabin
5919
6M2
Hulse Mine

1.3 SCOPE OF WORK

Five primary work elements were completed during this study. They are:

1. Computation and merging of terrain corrections;
2. Synthesis of regional and valley specific geological data;
3. Evaluation of the regional field and residual separation;
4. Inverse modeling to estimate depth to bedrock; and
5. Interpretation of structural relationships.

The gravitational field within Lake Valley was defined by measurements from 529 stations. The principal facts for these stations are listed in Appendix A2.0, and their distribution is shown in Drawing 1.0. These data were made of 403 new measurements by the Defense Mapping Agency Hydrographic-Topographic Center/Geodetic Survey Squadron (DMAHTC/GSS) and 126 measurements which were obtained from the Defense Mapping Agency Aerospace Center (DMAAC) library.

Many additional stations were used in the calculation of a regional trend surface over a larger area containing Lake and Spring valleys and the surrounding mountain ranges.

2.0 GRAVITY DATA REDUCTION

DMAHTC/GSS obtained the basic observations for the new stations and reduced them to Simple Bouguer Anomalies (SBA) as described in Appendix A1.0. Up to three levels of terrain corrections were applied to the new stations to convert the SBA to the Complete Bouguer Anomaly (CBA). Only the first two levels of terrain corrections described below were applied to the library stations.

First, the DMAAC, St. Louis, Missouri, used its library of digitized terrain data and a computer program to calculate corrections out to 104 miles (167 km) from each station. When the program could not calculate the terrain effects near a station, a ring template was used to estimate the effect of terrain within approximately 3000 feet (914 m) of the station. The third level of terrain corrections was applied to those stations where 10 feet (3 m) or more of relief were observed within 130 feet (40 m). In these cases, the elevation differences were measured in the field at a distance of 130 feet (40 m) along six directions from the stations. These data were used to calculate the effect of the very near relief.

The principal facts and CBA values for the Lake Valley stations are listed in Appendix A2.0.

3.0 LAKE VALLEY GEOLOGIC SUMMARY

Lake Valley is located in east-central Nevada within the eastern portion of the Great Basin region of the Basin and Range Physiographic province. The valley and adjacent mountains generally trend north-south except for the northern Fortification Range and the Pioche Hills which trend northwest-southeast (Figure 2).

The southern Schell Creek Range, on the west side of the valley, is composed of faulted Paleozoic limestone, dolomite, shale, and minor Tertiary quartz diorite and rhyolite rocks. Dutch John Mountain and Grassy Mountain are composed of Paleozoic limestones, siltstones, and shales. The Fairview Range is predominantly low-relief hills of Tertiary volcanics with only isolated outcrops of Upper Paleozoic clastic and carbonate rocks. The Highland and Bristol ranges form a gently eastward tilted fault block composed of limestone, dolomite, and shale. The western portion of the Pioche Hills is composed of Cambrian carbonates and quartzites which are overlain in the eastern portion by Tertiary volcanic rocks.

On the east side of the valley, the Fortification Range is composed of Paleozoic carbonates in the north and middle Tertiary volcanics in the south. The Wilson Creek Range is primarily composed of Tertiary volcanic rocks overlain in the north by younger volcanics. The basement rock in northern Lake Valley is thought to be carbonate on the west side of the valley and volcanic rock on the east side, whereas in the south, basement is predominantly volcanics over Paleozoic carbonates.

Lake Valley is divided into two parts by a low, gentle topographic divide between an enclosed basin in the north and a broad, dissected channel named Patterson Wash in the south. The northern basin contains a modern playa.

The valley fill in the northern basin is composed of fine-grained sediments first deposited in a Pliocene lake covering the entire valley and then reworked in a smaller late Pleistocene lake located north of the topographic divide (Tschanz, 1970). The valley margins are composed of sand and sandy gravel deposits of coalescing alluvial fans.

In central Patterson Wash, surface exposures include argillaceous tuffs, low-density silicic ash, medium-grained sandstones, and conglomerates (EWI, 1981). Subsurface valley-fill in this portion of Lake Valley probably includes water-laid tuffs, sands, silts, and clays, with the finer grained material concentrated toward the center of the valley. There also may be interbedded conglomerates, lacustrine limestones, and basalt flows (Tschanz, 1970).

Lake Valley is typical of the the intermontane valleys in the Basin and Range province in that it resulted from development of a tilted-fault-block, or graben structure. A major range-bounding normal fault occurs along the western margin of Lake Valley near the Schell Creek Range (Tschanz, 1970) and on Dutch John Mountain and Grassy Mountain (EWI, 1981). North trending surface faults and lineaments in the valley-fill about 6 miles (9.6 km) basinward from Schell Creek Range represent another

younger fault. A set of northeast trending lineaments in the alluvium between the Grassy Mountain-Fairview Range boundary and the southern end of the Fortification Range is of uncertain origin (EWI, 1981).

4.0 INTERPRETATION

The basis of interpretation is the Complete Bouguer Anomaly (CBA). Drawing 1 shows the location of the gravity stations and contours of the CBA gravity field. The contours were generated by a computer program. Since contouring and other mathematical treatment of irregularly spaced data are inefficient, the station CBA and elevation data were first reduced to sets of values at uniformly spaced points (nodes) in a geographic array, or grid. The value at a node was calculated from the station data within a circular area around the node. The algorithm which calculated the nodal value used a bell-shaped function to weight the station values. In this way, those station values nearest the node had the greatest influence on the calculated value. A node spacing of 1.2 miles (2 km) was chosen to match the average data spacing.

4.1 REGIONAL-RESIDUAL SEPARATION

A fundamental part of the gravity interpretation is the separation of regional effects from the local effects of the valley and its fill. The CBA contains long wavelength components from deep and broad geologic structures extending far beyond the valley. These long wavelength components, called the regional gravity, were approximated by upward continuation of the gravity field. Upward continuations were made to successively higher elevations until the negative anomaly over the valley was essentially smoothed out. The final continuation was calculated for an elevation of 90,000 feet (27,432 m). This regional

field was subtracted from the CBA and the resulting residual gravity anomaly was adjusted by a constant +5.0 milligals so that the zero residual would approximately fit the existing rock outcrops.

4.2 DENSITY SELECTION

The construction of a geologic model from the residual anomaly requires selection of density values representative of the alluvial fill and of the underlying rock. Because only very generalized density information is available, the geologic interpretation of the gravity data can be only a coarse approximation. Seven borings were drilled approximately 175 feet (53 m) into the alluvium during Verification studies. The average of the densities measured at the bottom of these borings was 2.0 g/cm^3. To account for compaction with depth (Woollard, 1962; and Grant and West, 1965), a density of 2.3 g/cm^3 was used in the modeling process.

The basement rocks underlying the alluvium of Lake Valley are assumed to be similar to the rocks comprising the adjacent mountain ranges. These ranges are predominantly comprised of Paleozoic carbonate rocks, but significant amounts of Paleozoic siliceous clastic rocks (quartzites and shales) and older siliceous-to-intermediate volcanic rocks are present. Published values for Paleozoic carbonate and clastic rocks typically range between 2.6 to 2.9 g/cm^3. The carbonate rocks in Nevada and Utah are commonly reported to be relatively high in density, on the order of 2.8 g/cm^3. This value was selected to represent

the density of the basement rock. The density of siliceous to intermediate volcanic rocks generally ranges between 2.0 to 2.5 g/cm^3 depending on the degree of welding, compaction, and alteration. The older volcanics in the Lake Valley area are probably at the higher end of this density range, being approximately equivalent to dense alluvium or between the density of alluvium and the density of bedrock. The information available regarding the volume and characteristics of subsurface volcanic rocks in Lake Valley is insufficient to make an estimate of their effect on the geologic model. The density contrast used for modeling was $-0.50\ g/cm^3$.

4.3 MODELING

Modeling was done with the aid of a computer program which iteratively calculates a three-dimensional solution of gravity anomaly data (Cordell, 1970). The gravity anomaly is represented by discrete values on a two-dimensional grid. The source of the anomaly (the volume of low-density valley fill) is represented by a set of vertical prism elements. The tops of the prisms lie in a common horizontal plane. The bottoms of the prisms collectively represent the bottom of the valley fill. Each prism has a cross-sectional area equal to one grid square and a uniform density. A grid square of 1.2 miles by 1.2 miles (2 km by 2 km) was selected as representative of the gravity station distribution. Computations were made for eight iterations of mutually interactive prism adjustments. The root-mean-square error between the observed residual gravity field and the field calculated for the final model of the entire valley was less than 0.7 milligal.

The calculated thickness of the valley fill depends upon the accuracy of the -0.50 g/cm^3 density contrast (i.e., fill density minus rock density) used. Since neither density is perfectly known, nor even uniform, the calculated thickness should be expected to contain a corresponding degree of uncertainty. The calculated thickness of fill, or interpreted depth to rock, is contoured in Drawing 2.

4.4 DISCUSSION OF RESULTS

The depth-to-rock contours in Drawing 2 show uneven basement topography. It is deep in the north-central part of the valley, shallow in the central part, and of intermediate depth in the south. The surficial topographic differences between the northern and southern parts of the valley appear to be related to the basement structure. The deeper part of the valley shows a slightly different axial trend than the remainder of the valley.

The steep gravity gradient (Drawing 1) on the west side of the deepest part of the valley suggests the existence of a major fault system. The gravity gradient opposite it, on the east side, is not as steep nor as great in amplitude; it suggests a deeper fault with smaller vertical displacement. The north-trending surficial faults and lineaments in the valley fill described in Section 3.0 may be related to the large fault system on the west suggested by the gravity data. Also, a previously interpreted fault is shown near the western margin of the valley by a dotted line on the geologic base map in Drawing 2.

The second vertical derivative of the CBA field was calculated to aid in drawing the line of inflection, which theoretically marks the location of a normal fault. Placement of the interpreted fault lines in Drawing 2 was guided by the locations of the calculated lines of inflection.

The gravity results are interpreted as indicating that the Lake Valley basin is principally the result of the uneven subsidence of three blocks: a northern block, corresponding to the most pronounced gravity minimum; a central block; and a southern block, corresponding to the lesser gravity minimum.

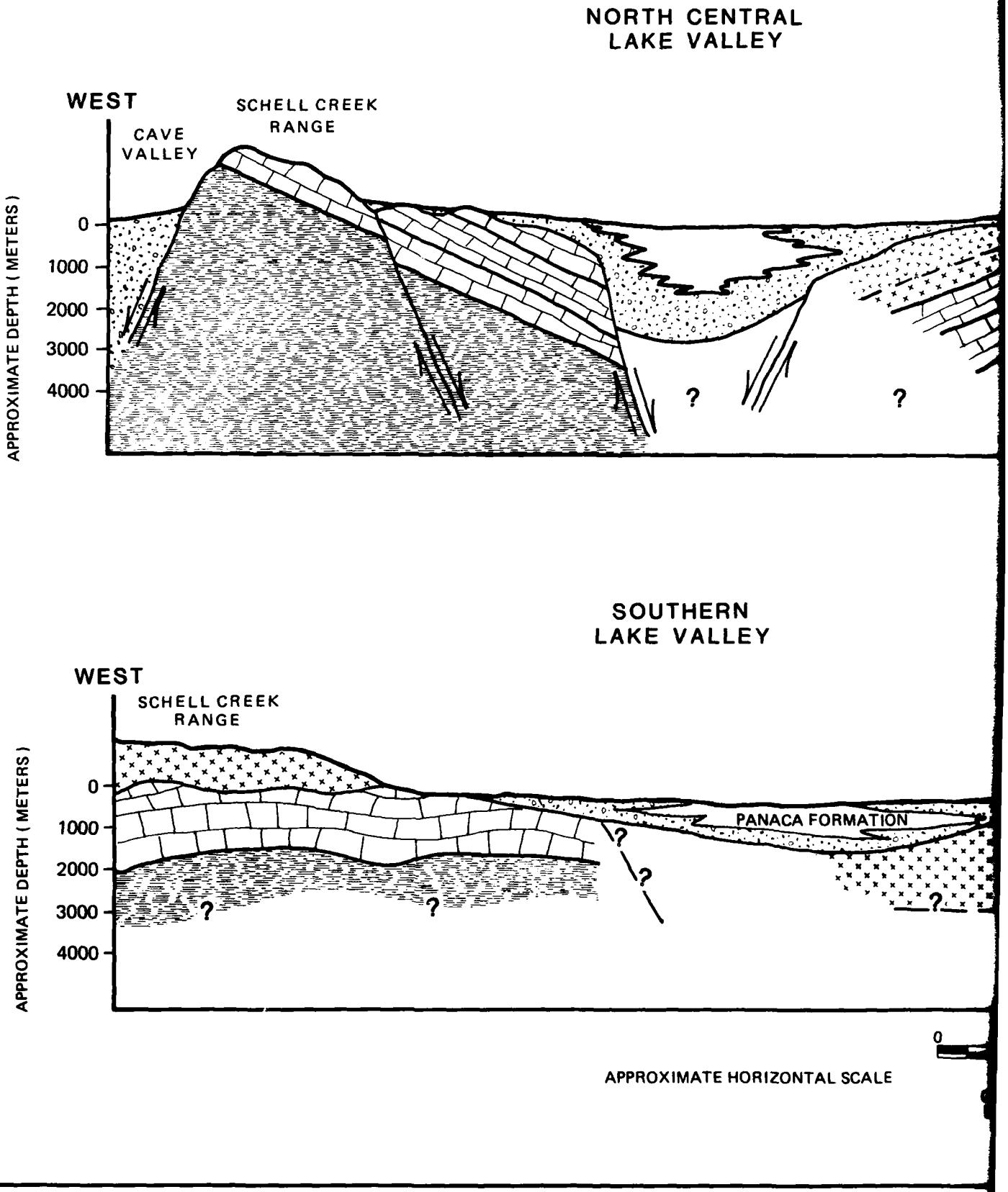
The northern block is tilted downward to the west. This tilt may be the cause of an apparent shift in the axial alignment of the valley.

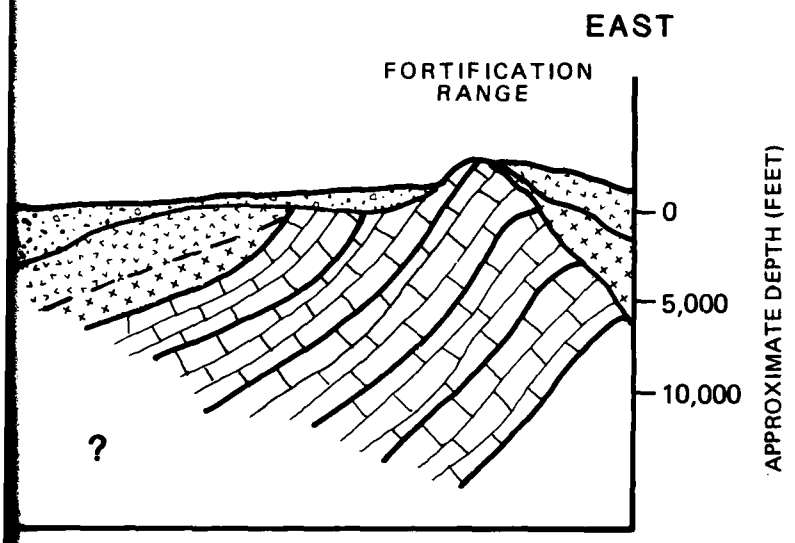
The previously described northeast-trending lineaments in the alluvium may indicate mark a zone of transverse faulting or differential compaction between the deep northern and central blocks.

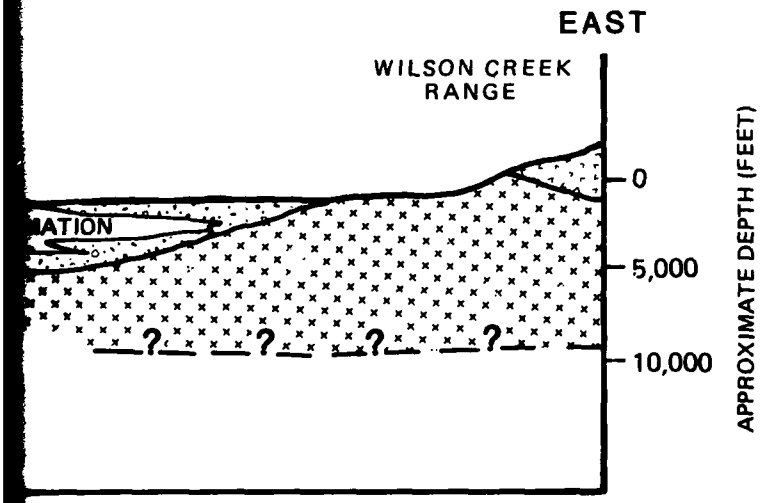
The central block is in the narrowest and shallowest part of the valley, flanked on both sides by volcanic rocks. If there is a significant thickness of volcanic rocks with an intermediate density underlying the alluvium, the contours of depth to carbonate bedrock from our two-density model are too shallow.

The southern block has apparently been stable during Quaternary time since major faulting has not occurred in the Pliocene or Miocene lake beds in the area.

Interpreted faults are shown in Drawing 2 only for the northern block where the gravity gradients are defined best. These interpretations were aided by regional geologic information from published reports, aerial photographs, and surface geologic mapping. Figure 3 shows interpreted geologic cross-sections which are consistent with gravity data and geologic information.

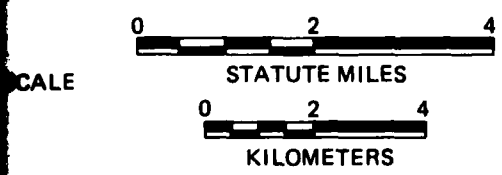

NORTH CENTRAL
LAKE VALLEY
WEST
CAVE
VALLEY
SCHELL CREEK
RANGE
APPROXIMATE DEPTH (METERS)
0
1000
2000
3000
4000
?
?
SOUTHERN
LAKE VALLEY
WEST
SCHELL CREEK
RANGE
APPROXIMATE DEPTH (METERS)
0
1000
2000
3000
4000
PANACA FORMATION
?
?
?
?
?
0
APPROXIMATE HORIZONTAL SCALE





EXPLANATION

- QUATERNARY PLAYA AND TERTIARY LACUSTRINE DEPOSITS
- QUATERNARY AND TERTIARY BASIN-FILL DEPOSITS
- UPPER TERTIARY VOLCANICS
- MIDDLE TERTIARY VOLCANICS
- PALEOZOIC CARBONATES
- CAMBRIAN SILICEOUS AND CARBONATE ROCKS



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GENERALIZED CROSS-SECTIONS
LAKE VALLEY, NEVADA

20 MAY 81

FIGURE 3

5.0 CONCLUSIONS

Lake Valley gravity data indicate that the valley is underlain by three subsidence blocks, or grabens. There is deep subsidence in the north-central valley between Schell Creek Range and Fortification Range. Shallow subsidence is found in the central valley between Grassy Mountain/Fairview Range and Wilson Creek Range. There is intermediate subsidence in the south valley between southern Fairview Range/northern Bristol Range and Wilson Creek Range. The range of depths to carbonate bedrock along the valley axis is interpreted to be 2000 to 8000 feet, except at the northern and southern ends where the depth is about 1000 feet. The northern subsidence block is tilted downward to the west. Faults and lineaments in the alluvium indicate Quaternary movement of the northern block.

The calculated depths to carbonate bedrock are necessarily approximate because the complex and imperfectly known density distribution has been represented by a simple two-density model. Also, the residual gravity anomaly is necessarily based on an interpreted regional field. An average density contrast of -0.50 g/cm^3 between the alluvium and bedrock was used to calculate the thickness of the valley-fill material. Future studies that acquire better density data or measure actual depths to bedrock in deep parts of the valley can be used to refine the gravity interpretation.

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APPENDIX A1.0

GENERAL PRINCIPLES OF THE GRAVITY EXPLORATION METHOD

A1.0 GENERAL PRINCIPLES OF THE GRAVITY EXPLORATION METHOD

A1.1 GENERAL

A gravity survey involves measurement of differences in the gravitational field between various points on the earth's surface. The gravitational field values being measured are the same as those influencing all objects on the surface of the earth. They are generally associated with the force which causes a 1-gm mass to be accelerated at 980 cm/sec^2. This force is normally referred to as a 1-g force.

Even though in many applications the gravitational field at the earth's surface is assumed to be constant, small but distinguishable differences in gravity occur from point to point. In a gravity survey, the variations are measured in terms of milligals. A milligal is equal to 0.001 cm/sec^2 or 0.00000102 g. The differences in gravity are caused by geometrical effects, such as differences in elevation and latitude, and by lateral variations in density within the earth. The lateral density variations are a result of changes in geologic conditions. For measurements at the surface of the earth, the largest factor influencing the pull of gravity is the density of all materials between the center of the earth and the point of measurement.

To detect changes produced by differing geological conditions, it is necessary to detect differences in the gravitational field as small as a few milligals. To recognize changes due to

geological conditions, the measurements are "corrected" to account for changes due to differences in elevation and latitude.

Given this background, the basic concept of the gravitational exploration method, the anomaly, can be introduced. If, instead of being an oblate spheroid characterized by complex density variations, the earth were made up of concentric, homogeneous shells, the gravitational field would be the same at all points on the surface of the earth. The complexities in the earth's shape and material distribution are the reason that the pull of gravity is not the same from place to place. A difference in gravity between two points which is not caused by the effects of known geometrical differences, such as in elevation, latitude, and surrounding terrain, is referred to as an "anomaly."

An anomaly reflects lateral differences in material densities. The gravitational attraction is smaller at a place underlain by relatively low density material than it is at a place underlain by a relatively high density material. The term "negative gravity anomaly" describes a situation in which the pull of gravity within a prescribed area is small compared to the area surrounding it. Low-density alluvial deposits in basins such as those in the Nevada-Utah region produce negative gravity anomalies in relation to the gravity values in the surrounding mountains which are formed by more dense rocks.

The objective of gravity exploration is to deduce the variations in geologic conditions that produce the gravity anomalies identified during a gravity survey.

A1.2 INSTRUMENTS

The sensing element of a LaCoste and Romberg gravimeter is a mass suspended by a zero-length spring. Deflections of the mass from a null position are proportional to changes in gravitational attraction. These instruments are sealed and compensated for atmospheric pressure changes. They are maintained at a constant temperature by an internal heater element and thermostat. The absolute value of gravity is not measured directly by a gravimeter. It measures relative values of gravity between one point and the next. Gravitational differences as small as 0.01 milligal can be measured.

A1.3 FIELD PROCEDURES

The gravimeter readings were calibrated in terms of absolute gravity by taking readings twice daily at nearby USGS gravity base stations. Gravimeter readings fluctuate because of small time-related deviations due to the effect of earth tides and instrument drift. Field readings were corrected to account for these deviations. The magnitude of the tidal correction was calculated using an equation suggested by Goguel (1954):

$$C = P + N\cos\phi\,(\cos\phi + \sin\phi) + S\cos\phi\,(\cos\phi - \sin\phi)$$

where C is the tidal correction factor, P, N, and S are time-related variables, and ϕ is the latitude of the observation point. Tables giving the values of P, N, and S are published annually by the European Association of Exploration Geophysicists.

The meter drift correction was based on readings taken at a designated base station at the start and end of each day. Any difference between these two readings after they were corrected for tidal effects was considered to have been the result of instrumental drift. It was assumed that this drift occurred at a uniform rate between the two readings. Corrections for drift were typically only a few hundredths of a milligal. Readings corrected for tidal effects and instrumental drift represented the observed gravity at each station. The observed gravity values represent the total gravitational pull of the entire earth at the measurement stations.

A1.4 DATA REDUCTION

Several corrections or reductions are made to the observed gravity to isolate the portion of the gravitational pull which is due to the crustal and near-surface materials. The gravity remaining after these reductions is called the "Bouguer Anomaly." Bouguer Anomaly values are the basis for geologic interpretation. To obtain the Bouguer Anomaly, the observed gravity is adjusted to the value it would have had if it had been measured at the geoid, a theoretically defined surface which approximates the surface of mean sea level. The difference between the "adjusted" observed gravity and the gravity at the geoid calculated for a theoretically homogeneous earth is the Bouguer Anomaly.

Four separate reductions, to account for four geometrical effects, are made to the observed gravity at each station to arrive at its Bouguer Anomaly value.

a. Free-Air Effect: Gravitational attraction varies inversely as the square of the distance from the center of the earth. Thus, corrections must be applied for elevation. Observed gravity levels are corrected for elevation using the normal vertical gradient of:

FA = -0.09406 mg/ft (-0.3086 milligals/meter)

where FA is the free-air effect (the rate of change of gravity with distance from the center of the earth). The free-air correction is positive in sign since the correction is opposite the effect.

b. Bouguer Effect: Like the free-air effect, the Bouguer effect is a function of the elevation of the station, but it considers the influence of a slab of earth materials between the observation point on the surface of the earth and the corresponding point on the geoid (sea level). Normal practice, which is to assume that the density of the slab is 2.67 grams per cubic centimeter was followed in these studies. The Bouguer correction (B_c), which is opposite in sign to the free-air correction, was defined according to the following formula.

$B_c = 0.01276\ (2.67)\ h_f$ (milligals per foot)

$B_c = 0.04185\ (2.67)\ h_m$ (milligals per meter)

where h_f is the height above sea level in feet and h_m is the height in meters.

c. Latitude Effect: Points at different latitudes will have different "gravities" for two reasons. The earth (and the geoid) is spheroidal, or flattened at the poles. Since points at higher latitudes are closer to the center of the earth than points near the equator, the gravity at the higher latitudes is larger. As the earth spins, the centrifugal acceleration causes a slight decrease in gravity. At the higher latitudes where the earth's radii are smaller, the centrifugal acceleration diminishes. The gravity formula for the Geodetic Reference System, 1967, gives the theoretical value of gravity at the geoid as a function of latitude. It is:

$$g = 978.0381\ (1 + 0.0053204\ \sin^2 \phi - 0.0000058\ \sin^2 2\phi)\ \text{gals}$$

where g is the theoretical acceleration of gravity and ϕ is the latitude in degrees. The positive term accounts for the spheroidal shape of the earth. The negative term adjusts for the centrifugal acceleration.

The previous two corrections (free air and Bouguer) have adjusted the observed gravity to the value it would have had at the geoid (sea level). The theoretical value at the geoid for the latitude of the station is then subtracted from the adjusted observed gravity. The remainder is called the Simple Bouguer Anomaly (SBA). Most of this gravity represents the effect of material beneath the station, but part of it may be due to irregularities in terrain (upper part of the Bouguer slab) away from the station.

d. Terrain Effect: Topographic relief around the station has a negative effect on the gravitational force at the station. A nearby hill has upward gravitational pull and a nearby valley contributes less downward attraction than a nearby material would have. Therefore, the corrections are always positive. Corrections are made to the SBA when the terrain effects were 0.1 milligal or larger. Terrain corrected Bouguer values are called the Complete Bouguer Anomaly (CBA). When the CBA is obtained, the reduction of gravity at individual measurement points (stations) is complete.

A1.5 INTERPRETATION

To interpret the gravity data, the portion of the CBA that might be caused by the light-weight, basin-fill material must be separated from that caused by the heavier bedrock material which forms the surrounding mountains and presumably the basin floor. The first step is to create a regional field. A regional field is an estimation of the values the CBA would have had if the light-weight sediments (the anomaly) had not been there. Since the valley-fill sediments are absent at the stations read in the mountains, one approach is to use the CBA values at bedrock stations as the basis for constructing a second order polynomial surface to represent a regional field over the valley.

Where there are insufficient bedrock stations to define a satisfactory regional trend, another approach is to estimate the regional by the process of upward continuation of the CBA field.

In Potential Theory, a field normal to a surface, regardless of its actual source, may be considered as originating in an areal distribution of mass on that surface. If the field strength is known the surface density of mass (grams per square centimeter) can be calculated. The observed gravity field at the surface of the earth approximately fulfills the requirements of this theory: thus the observed (Bouguer anomaly) field can be used to compute a surficial distribution of mass which would reproduce the field, and most importantly, account for the gravity field anywhere above the surface of observation. On this basis, the Bouguer anomaly field is readily "continued" to level surfaces above the ground.

An important property of such "upward continuation" is that the resultant field (which can be represented by a contour map), with increasing altitudes of continuation, changes more with respect to shallow sources than it does with respect to deeper sources. The anomalous parts of the field ascribed to shallow density distribution tend to vanish as the continuation is carried upward whereas the field produced by deeper sources changes only slightly, so that upward continuations produce "regional"-type fields.

The difference between the CBA and the regional field is called the "residual" field or residual anomaly. The residual field is the interpreter's estimation of the gravitational effect of the geologic anomaly. The zero value of the residual anomaly is not exactly at the rock outcrop line but at some distance on the

"rock" side of the contact. The reason for this is found in the explanation of the terrain effect. There is a component of gravitational attraction from material which is not directly beneath a point.

If the "regional" is well chosen, the magnitude of the residual anomaly is a function of the thickness of the anomalous (fill) material and the density contrast. The density contrast is the difference in density between the alluvial and bedrock material. If this contrast were known, an accurate calculation of the thickness could be made. In most cases, the densities are not well known and they also vary within the study area. In these cases, it is necessary to use typical densities for materials similar to those in the study area.

If the selected average density contrast is smaller than the actual density contrast, the computed depth to bedrock will be greater than the actual depth and vice-versa. The computed depth is inversely proportional to the density contrast. A ten percent error in density contrast produces a ten percent error in computed depth. An iterative computer program is used to calculate a subsurface model which will yield a gravitational field to match (approximately) the residual gravity anomaly.

The second vertical derivative (SVD) of gravitational field is used to aid the interpreter in evaluating the subsurface mass distribution. Once the CBA field has been projected onto a uniform grid system, its SVD at the grid nodes is readily computed.

In accordance with Laplace's Equation in Free Space, the negative of the second vertical derivative is equal to the sums of the second derivatives in the x-direction and in the y-direction. The second vertical derivative is an indication of the curvature of the Bouguer anomaly field. In particular the zero-value of the SVD indicates the inflection in the field as it changes from "concave-upward" (algebraically negative SVD) to "convex-upward" (algebraically positive SVD). In a general way the zero SVD falls on the tightest contours of the field and where contours are nearly parallel its location can be established by eye. However, where contours diverge, converge, or change direction this is not always so readily done. The zero SVD contour line may be an indicator of a line of faulting, the pinchout of a stratum, truncation of a stratum at an unconformity or merely a marked change in shape or in density of a geologic unit.

APPENDIX A2.0

LAKE VALLEY, NEVADA

GRAVITY DATA

LAKE VALLEY GRAVITY DATA

STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	+CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
0245	38	340	114	395	358261T	0	193421448	70541145908199707		1000	81333	
0239	38	351	114	440	350200T	0	131421452	69882149825199723		-2670	80341	
0246	38	366	114	402	357329T	0	159421494	70437146303199745		480	81099	
5028	38	371	114	331	560230T	0	231421530	71472144287199752		1180	80881	
0251	38	408	114	396	758530T	0	178421574	70517144980199807		220	80448	
1212	38	410	114	336	061135T	0	246421600	71405143619199809		1310	80726	
0248	38	420	114	412	355640T	0	142421590	70289147398199824		-80	81082	
0241	38	444	114	410	51010T	0	130421624	69868149758199859		-2110	80620	
0258	38	448	114	390	060499T	0	207421650	70613143940199865		980	80557	
0252	38	448	114	406	856280T	0	149421644	70368146564199865		-360	80599	
0257	38	465	114	379	064429T	0	305421686	70773142011199890		2720	81065	
0259	38	468	114	397	558550T	0	173421684	70503144920199894		100	80313	
0254	38	475	114	415	254649T	0	145421691	70244147813199905		-680	80825	
7081	38	480	114	234	060728T	0	135421770	72893142804199912		0	79445	
7083	38	485	114	275	058159T	0	107421763	72293143570199919		-1630	78637	
0260	38	515	114	387	561690T	0	216421775	70647143554199963		1610	80796	
0262	38	530	114	407	455889T	0	138421777	70356146709199970		-680	80388	
0263	38	531	114	414	254629T	0	132421795	70256147609199986		-990	80512	
0282	38	564	114	427	452881T	0	136421851	70061149557200035		-730	81366	
1584	38	570	114	348	060719T	0	231421892	71222143702200044		760	80301	
0266	38	575	114	392	958560T	0	187421884	70565145175200051		200	80427	
0275	38	593	114	402	556280T	0	145421914	70424146313200077		-820	80125	
0278	38	602	114	417	554062T	0	128421925	70204147913200090		-1320	80368	
5029	38	622	114	413	254511T	0	137421963	70266147426200120		-1410	80137	
0294	38	623	114	449	152500T	0	121421952	69741149611200121		-1120	81091	
0274	38	627	114	406	255600T	0	135421975	70368146706200127		-1120	80055	
0273	38	654	114	399	056660T	0	149422046	70472145711200181		-1170	79659	
0297	38	687	114	423	755000T	0	122422080	70110147246200215		-1230	80132	
0295	38	705	114	443	353930T	0	123422106	69822148584200241		-920	80803	
0296	38	710	114	432	055230T	0	129422119	69987147473200248		-820	80469	
7412	38	710	114	441	153930T	0	127422116	69854148611200248		-900	80837	
0276	38	711	114	412	156220T	0	121422128	70278146571200250		-790	80151	
0271	38	730	114	391	858281T	0	149422171	70574145057200278		-390	79879	
0270	38	740	114	382	459911T	0	183422193	70711144838200292		900	80653	
7411	38	750	114	380	061529T	0	150422212	70745143580200307		1140	80320	
0781	38	761	114	430	357749T	0	126422214	70010146652200323		650	81086	
0780	38	762	114	438	556181T	0	107422213	69890146994200325		-480	80467	
0782	38	771	114	422	556270T	0	124422236	70123146360200338		-1040	79884	
0790	38	774	114	396	857621T	0	145422288	70498145868200371		-300	80195	
0784	38	807	114	442	158560T	0	147422295	69835145467200390		160	80337	

LAKE VALLEY GRAVITY DATA

STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	ELEV. +CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
0783	38	815	114	27456870	T	0	126422315	70050146386200402			-520	80216
0785	38	819	114	49157021	T	0	122422315	69733146525200408			-240	80432
1211	38	826	114	349558789	T	0	111422364	71187144335200418			-770	79291
0793	38	834	114	387858471	T	0	202422365	70627146123200430			690	80952
0786	38	873	114	435257470	T	0	122422420	69933146343200487			-80	80442
0800	38	892	114	427660341	T	0	149422458	70043144701200515			940	80519
0787	38	922	114	444456850	T	0	135422507	69795146689200559			-390	80355
7082	38	940	114	254058071	T	0	379422613	72577144555200585			-1400	79169
0811	38	957	114	379361329	T	0	123422596	70746144341200610			1410	80633
0804	38	963	114	432361171	T	0	163422587	69971144694200619			1610	80923
7036	38	965	114	330563232	T	0	406422629	71458141922200622			770	79626
0803	38	997	114	440060732	T	0	150422647	69857144782200669			1230	80680
7286	381005		114	362160246	T	0	117422691	70995143831200680			-170	79397
0805	381005		114	426366581	T	0	386422667	70057141111200680			3050	80736
7304	381025		114	233565850	T	0	320422779	72872139385200710			610	78490
7442	381055		114	436860397	T	0	140422756	69902145498200754			1550	81110
0819	381068		114	442559531	T	0	125422778	69818145722200773			940	80775
0820	381149		114	443961680	T	0	161422927	69794143784200891			910	80041
1582	381230		114	353060961	T	0	122423110	71117143702201010			30	79382
1210	381418		114	353061821	T	0	115423458	71108143516201285			380	79425
7049	381430		114	355061837	T	0	119423480	71078143601201303			460	79499
7296	381445		114	236292959	T	01	979423554	72810121606201325			7710	78009
7050	381495		114	280064777	T	0	167423629	72169140864201398			390	78477
7441	381515		114	422060843	T	0	121423612	70097144428201427			220	79611
1581	381530		114	354062359	T	0	114423665	71088143242201449			440	79314
1580	381730		114	359062139	T	0	132424033	71005143802201742			500	79462
7303	381802		114	240065781	T	0	541424213	72736140749201848			770	78891
7424	381825		114	419059551	T	0	195424186	70126145228201882			-630	79255
7032	381916		114	363061568	T	0	141424375	70938144291202015			180	79341
1209	381932		114	364261624	T	0	140424405	70920144257202039			180	79320
7047	381980		114	247065148	T	0	176424539	72625141145202109			310	78286
7045	382000		114	317059469	T	0	100424548	71604144022202138			-2170	77650
7423	382020		114	433557799	T	0	273424542	69906146055202168			-1730	78823
1579	382060		114	369060679	T	0	127424640	70844144962202226			-190	79247
7031	382304		114	373859760	T	0	125425089	70762146083202584			-280	79455
7297	382356		114	273561270	T	0	135425224	72220144069202660			-950	78285
1578	382380		114	381060259	T	0	145425227	70654146302202696			280	79885
7298	382385		114	208870827	T	0	319425304	73160137810202703			1710	77899
7295	382518		114	313559813	T	0	91425508	71629144465202898			-2160	77531
7283	382535		114	433862221	T	0	169425494	69878144719202923			320	79289

LAKE VALLEY GRAVITY DATA

STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	ELEV. +CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
1208	38	2590	114	38	2259892T	0	230425615	70626146525203004			-140	79670
1577	38	2720	114	38	6059419T	0	330425854	70565147072203195			-230	79840
7030	38	2782	114	38	6259846T	0	204425969	70559146772203286			-210	79574
7294	38	2858	114	28	0263068T	0	151426150	72097144154203397			70	78731
1589	38	2900	114	38	7060141T	0	134426187	70542146652203459			-230	79394
7285	38	3050	114	40	8062087T	0	162426456	70229145480203679			190	79192
1207	38	3099	114	39	0059711T	0	128426553	70489146321203751			-1250	78508
7301	38	3114	114	20	5562484T	0	112426654	73169144422203773			-570	78232
7029	38	3135	114	38	8559738T	0	123426621	70509146176203804			-1430	78323
7293	38	3138	114	33	4559262T	0	97426647	71293145344203808			-2710	77177
1576	38	3210	114	39	1060079T	0	130426758	70469145722203914			-1670	77970
1575	38	3330	114	39	0059692T	0	146427073	70475146022204164			-1980	77806
7302	38	3540	114	23	9860978T	0	130427428	72648145901204399			-1130	78200
7027	38	3558	114	38	6759642T	0	157427404	70515146906204425			-1410	78407
7219	38	3570	114	43	5074003T	0	543427408	69813138963204443			4120	79443
7422	38	3580	114	42	5569649T	0	472427430	69951141483204458			2530	79262
1206	38	3593	114	38	7059613T	0	167427468	70509146909204477			-1480	78357
7017	38	3638	114	32	2560719T	0	124427669	71440146001204616			-1490	77924
7021	38	3690	114	24	5061148T	0	134427703	72565146226204619			-870	78414
1574	38	3700	114	38	7059619T	0	193427666	70504147412204634			-1130	78733
7017	38	3784	114	32	4260719T	0	120427846	71411146006204758			-1630	77780
7291	38	3805	114	43	0089934T	0	1445427845	69875128318204788			8110	78905
1573	38	4060	114	37	7059879T	0	178428336	70632147782205163			-1040	78708
1205	38	4067	114	37	8559879T	0	188428348	70610147816205174			-1020	78748
7016	38	4079	114	32	8561867T	0	153428390	71334146914205191			-80	78983
7020	38	4082	114	25	8060220T	0	121428423	72356147617205196			-920	78661
7015	38	4157	114	37	6060266T	0	170428516	70641147391205306			-1210	78400
7022	38	4174	114	21	2960715T	0	142428612	73005147298205331			-910	78522
1572	38	4360	114	36	0060449T	0	140428897	70864147652205605			-1080	78450
7019	38	4415	114	29	2059117T	0	134429025	71846149053205685			-1010	78964
1204	38	4470	114	35	5060971T	0	141429103	70931147310205766			-1090	78261
7013	38	4514	114	34	0060538T	0	140429190	71146147548205831			-1330	78170
7011	38	4560	114	37	3563117T	0	176429262	70658146116205899			-400	78246
5101	38	4595	114	22	1659859T	0	330429387	72857148189205950			-1440	78470
4254	38	4595	114	29	7957900T	0	130429356	71752149015205950			-2470	77920
4253	38	4611	114	28	6257841T	0	128429390	71920149098205974			-2450	77948
4252	38	4636	114	27	5657900T	0	132429441	72072149021206011			-2520	77862
4210	38	4650	114	34	0060518T	0	157429441	71139147737206031			-1360	78157
4251	38	4653	114	26	4557930T	0	144429477	72232149093206036			-2440	77944
5102	38	4654	114	26	4257841T	0	145429479	72237149122206037			-2490	77925

LAKE VALLEY GRAVITY DATA

STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	ELEV. +CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
1571	384670		114338060531T			0	150429479	71167147732206061			-1380	78120
4250	384675		114254157920T			0	164429522	72382149375206068			-2200	78204
4249	384716		114243257910T			0	213429602	72537149375206128			-2270	78183
7008	384765		114335560007T			0	157429656	71199147887206200			-1860	77837
4248	384789		114235458051T			0	285429740	72647149242206236			-2380	78105
4247	384818		114228558940T			0	364429797	72745148667206278			-2160	78094
SPR089	384125		114210960971T			0	134428522	73037146913205259			963	78376
LV0102	382703		1142500		6470S	0	166425876	72544144068203170			1794	79892
SPR095	383958		114225059229T			0	116428207	72841147281205013			-1988	77927
LV0124	382875		1143571		5915Y	0	97426152	70978144475203422			-3278	76645
LV0126	382875		1143153		5930Y	0	99426168	71585145388203422			-2223	77650
SPR135	383572		1142743		8268V	872527427473		72146130106204446			3489	77903
SPR141	383366		1142685		8268C	322030427094		72241130803204143			4488	78350
LV0162	382696		1144012		8860V	463635425785		70345127201203145			7461	80923
LV0164	382468		1143811		5998C	0	180425390	70648146494202825			120	79843
LV0173	381791		1143794		7866V	561888424138		70705132802201832			5013	80128
SPR148	383175		1142825		7612C	241109426736		72047135275203863			3062	78233
LV0201	381690		1143564		6227Y	0	123423960	71045143519201684			443	79328
SPR164	383076		1142686		7482C	52	831426558	72254136462207717			3170	78534
LV0215	381937		1142769		6405C	0	160424448	72192142303202046			541	78856
LV0163	382590		1143815		6007C	0	408425615	70636146418203004			-49	79871
LV0262	381250		1143635		6538Y	7	260423143	70963141118201039			1615	79583
SPR166	383941		1142696		6941C	5	923428158	72195141108204988			1451	78705
CAV021	383599		1144473		8426C	592307427457		69633131241204486			6072	79699
CAV023	383492		1144381		9145C	813513427263		69772125213204328			6973	79376
CAV022	383558		114440672339T			0	585427384	69732139887204425			3551	79463
LV0001	384735		1143998		8072C	31	984429576	70269135397206156			5222	78706
LV0014	384250		1143307		6215S	0	147428705	71294147040205443			91	79041
LV0018	384140		1143375		6024S	0	136428499	71200148027205281			-558	79032
LV0041	384006		1144310		9695C	252229428216		69851123336205084			9522	78709
LV0064	383142		1144376		8266C	241706426616		69795132536203814			6532	80069
SPR026	384564		1142073		6815C	36	825429336	73065143348205905			1587	79204
SPR036	384878		1143730		7446S	6	473429850	70650139164206367			2883	77966
SPR068	383980		1142972		7102C	12	365428219	71793141462205046			3263	79417
SPR077	383787		1142920		7092C	18	374427864	71878141131204762			3122	79325
SPR152	382965		1142167		7135C	8	460426374	73014138619203554			2222	78355
SPR165	383148		1142516		6761C	8	290426698	72497141527203823			1340	78578
SPR042	384745		1143595		6749S	3	249429610	70852143424206171			775	78008
SPR050	384596		1143353		6162S	7	136429343	71210147157205952			-800	78326
CAV020	383849		1144466		8535S	251127427920		69632131765204853			7254	79296

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CAV024	383212	1144424	8263C	441	580426743	69722132481203917			6345	79786
LV0013	384230	1143054	6875S	18	273428678	7166114294020 5413			2235	79078
LV0035	384254	1144276	7695C	4	649428676	69889137093205449			4076	78483
LV0096	382834	1142356	6712S	5	169426216	72744142682203435			2421	79702
LV0103	382649	1142343	7777S	10	788425782	72775134327203090			4440	78713
LV0002	384537	1144108	7085C	5	271429206	70119141557205865			2378	78490
LV0012	384413	1143217	6825S	8	406429010	71416142945205682			1501	78637
LV0059	383377	1144300	7319C	14	403427053	69895139199204159			3930	79384
LV0114	382374	1142557	6733S	6	211425265	72478140549202687			1235	78487
LV0156	382876	1144382	7574C	16	591426160	69797137075203453			4914	79688
LV0165	382428	1144070	7048C	6	347425306	70273141407202766			4979	81293
LV0170	382090	1144031	8613C	122	214424682	70345128958202270			7766	80615
LV0218	382018	1142300	7104C	21	320424617	72871137839202165			2540	78652
LV0219	381849	1142637	7230C	10	450424290	72388136838201917			2974	78774
LV0227	381495	1142944	6544C	11	236423623	71959140097201398			292	78219
LV0230	381384	1142450	7712C	16	519423438	72685133127201235			4484	78715
LV0236	381156	1142469	6899V	10	235423015	72669137852200901			1887	78601
LV0282	38 539	1143645	7907V	261	624421828	70982131683199998			6114	80795
LV0293	383714	1144147	6897C	17	483427682	70101141784204655			2046	79022
LV0294	38 946	1142348	6970C	7	341422632	72857136576200594			1586	78161
LV0297	381632	1142459	8013C	11	718423896	72659130919201599			4747	78146
LV0292	382808	1142760	6462S	1	176426059	72160143257203324			753	78890
SPR007	384854	1142236	6030C	0	445429865	72814147893206331			-1686	78192
SPR008	384773	1142136	6259B	0	756429720	72963146685206212			-619	78790
SPR009	384512	1142201	6004S	0	283429234	72883148352205828			-969	78836
SPR010	384595	114221559878T		0	333429387	72858148165205950			-1429	78481
SPR011	384662	114223360020T		0	345429510	72828148105206049			-1455	78419
SPR012	384738	1142261	5921S	0	362429650	72784148602206161			-1833	78334
SPR013	384790	1142352	5805S	0	287429742	72649149278206237			-2326	78162
SPR014	384680	1142348	5816V	0	253429539	72661149075206075			-2263	78153
SPR015	384594	1142348	5831C	0	222429380	72666149031205949			-2040	78294
SPR016	384510	1142475	5819B	0	158429219	72486149421205825			-1638	78673
SPR017	384593	1142505	5800B	0	163429371	72438149592205947			-1769	78612
SPR018	384716	114244357910T		0	208429602	72522149399206128			-2228	78229
SPR019	384675	114254357920T		0	164429522	72379149394206068			-2163	78246
SPR020	384655	1142646	5793S	0	144429480	72231149111206039			-2407	77979
SPR021	384522	1142633	5809B	0	135429235	72256149399205843			-1773	78550
SPR022	384307	1142782	5803B	0	127429201	72041149476205821			-1730	78604
SPR023	384638	114275657900T		0	133429444	72072149041206014			-2481	77904
SPR024	384612	114286257841T		0	128429392	71920149110205975			-2429	77971

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SPR025	384596		1142979	5790	0T	0	130429358	7175214	9032205952		-2427	77955
SPR038	384851		1143243	5929	Y	0	153429875	7135514	8314206371		-2256	77675
SPR040	384825		1143085	5771	Y	0	141429777	7158614	9380206289		-2595	77863
SPR041	384839		1143495	6229	B	0	195429787	7099214	6672206309		-1012	77938
SPR043	384766		1143357	5995	Y	0	159429658	7119614	7898206202		-1881	77831
SPR044	384738		1143188	5820	V	0	142429612	7144214	9417206161		-1969	78323
SPR045	384717		1143025	5762	B	0	133429580	7167914	9238206130		-2663	77817
SPR046	384605		1143080	5793	0T	0	134429371	7160514	9190205965		-2254	78121
SPR047	384607		1143181	5819	9T	0	158429370	7145814	9237205968		-1956	78352
SPR048	384646		1143310	5916	0T	0	165429437	7127014	8595206025		-1752	78235
SPR049	384652		1143403	6053	1T	0	159429445	7113514	7735206034		-1330	78184
SPR051	384507		1143152	5949	Y	0	166429186	7150514	8649205821		-1183	78693
SPR052	384456		1142982	5891	S	0	136429099	7175414	9022205746		-1280	78763
SPR053	384373		1142868	5912	S	0	141428950	7192414	9184205624		-798	79179
SPR054	384382		1142720	5834	U	0	131428972	7213814	9765205637		-966	79267
SPR055	384338		1142619	5827	C	0	132428988	7228414	9559205646		-1246	79011
SPR056	384382		1142467	5839	B	0	141428983	7250414	9178205637		-1505	78720
SPR057	384428		1142354	5888	B	0	165429072	7266614	8970205705		-1319	78763
SPR058	384299		1142340	5880	V	0	144428834	7269314	8725205515		-1450	78639
SPR059	384291		1142547	5868	C	0	127428811	7239314	9284205503		-992	79121
SPR060	384259		1142690	5959	S	0	126428746	7218714	9154205456		-218	79584
SPR061	384240		1142865	6424	C	0	196428704	7193514	6002205428		1036	79322
SPR062	384177		1142596	5965	C	0	120428598	7232814	8627205335		-568	79207
SPR063	384236		1142437	5868	B	0	128428714	7255514	8769205422		-1427	78697
SPR064	384179		1142280	5930	S	0	130428615	7278614	7804205338		-1724	78181
SPR065	384147		1142376	5878	S	0	125428552	7264814	8205205291		-1765	78312
SPR066	384130		1142499	5930	S	0	118428515	7247114	8205205266		-1251	78641
SPR067	384060		1142723	6177	S	0	135428377	7215014	7164205163		137	79204
SPR070	384018		1142580	6028	C	0	129428305	7235914	7555205102		-813	78756
SPR071	384035		1142416	5934	B	0	115428343	7259614	7715205127		-1563	78313
SPR072	384060		1142252	5948	B	0	118428396	7283314	7218205163		-1965	77966
SPR073	383941		1142353	5936	0T	0	116428172	7269314	7563204988		-1558	78312
SPR074	383923		1142459	5986	9T	0	121428134	7254014	7471204962		-1143	78558
SPR075	383904		1142568	6078	1T	0	148428094	7238314	7068204934		-662	78756
SPR076	383835		1142685	6226	C	0	248428054	7221414	6306204906		3	79010
SPR078	383801		1142498	6103	S	0	146427907	7249014	6699204782		-644	78686
SPR079	383827		1142350	5986	B	0	112427961	7270314	7111204821		-1372	78324
SPR080	384437		1142193	6095	1T	0	220429096	7289814	7821205718		-533	78899
SPR082	384324		1142040	6312	S	0	218428893	7312614	6549205552		405	79095
SPR083	384338		1142185	6088	9T	0	180428913	7291514	7688205572		-577	78835

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SPR084	384234	1142151604697		0	155428722	72970147642205419			-865	78665
SPR093	383997	1142010613197		0	123428290	73187147287205071			-71	79138
SPR094	383978	1142129601317		0	119428249	73016147089205043			-1361	78249
SPR096	383861	1142222 5927S		0	113428029	72887147252204871			-1836	78061
SPR097	383889	1142041 6025B		0	113428088	73148147529204912			-678	78886
SPR103	383784	1142089 5955B		0	106427892	73084147393204758			-1318	78477
SPR104	383721	1142246 5967B		0	108427769	72860146786204665			-1720	78037
SPR105	383662	1142095 5980B		0	100427666	73082146634204578			-1662	78042
SPR110	383549	1142015 6046B		0	96427461	73204146171204412			-1339	78136
SPR111	383541	1142221 6009S		0	104427437	72905146014204400			-1832	77777
SPR112	383447	1142106 6050S		0	101427268	73077145662204262			-1659	77807
SPR118	383323	1142194610107		0	106427035	72956145417204080			-1242	78055
SPR119	383206	1142104 6202S		0	104426822	73093144930203908			-606	78345
SPR120	383241	1142006 6179B		0	101426891	73234145021203960			-783	78243
SPR126	383166	1142242 6157B		0	117426743	72895145062203849			-839	78278
SPR127	383048	1142196 6265S		0	143426526	72968144572203676			-139	78636
SPR128	383072	1142043632417		0	113426577	73189144244203711			54	78597
SPR133	383697	1142441611287		0	130427717	72578146216204630			-879	78401
SPR134	383675	1142570 6369C		0	200427671	72392145041204597			388	78865
SPR137	383616	1142398608597		0	125427569	72644146103204511			-1128	78240
SPR138	383629	1142262 5984B		0	108427598	72841146999204530			-1211	78487
SPR139	383539	1142357606497		0	122427428	72708146002204397			-1314	78122
SPR140	383489	1142526 6372C		0	206427328	72465144114204324			-237	78236
SPR142	383388	1142489 6291C		0	213427143	72524144594204176			-372	78384
SPR145	383304	1142464 6301C		0	172426989	72565144693204052			-55	78626
SPR146	383253	1142334 6151C		0	125426900	72756145314203977			-772	78374
SPR147	383163	1142443 6279B		0	173426729	72603144659203845			-89	78668
SPR150	383075	1142491 6443C		0	221426564	72538143500203716			426	78672
SPR151	383093	1142355 6242C		0	134426603	72734144508203742			-486	78359
SPR153	382980	1142003641017		0	127426409	73252143900203576			655	78919
SPR158	382813	1142071670507		0	156426097	73162142452203331			2230	79517
LV0003	384566	1143839 6481C		0	198429269	70507145310205908			401	78494
LV0004	384668	1143713 6467C		0	188429463	70685144990206058			-201	77930
LV0005	384590	1143655 6308C		0	160429321	70773146033205943			-540	78105
LV0006	384503	1143511609717		0	136429165	70986147172205815			-1260	78080
LV0007	384596	1143465 6155V		0	146429339	71048147166205952			-856	78297
LV0008	384502	1143417 6050C		0	143429167	71122147545205813			-1328	78180
LV0009	384469	1143699 6173B		0	160429095	70715146548205765			-1118	77988
LV0010	384415	1143548 6032B		0	141429001	70936147800205685			-1114	78453
LV0011	384364	1143399 6037Y		0	136428912	71155147768205610			-1024	78521

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LV0015	384255	1143499	5962B	0	136428707	710151482832054	50	-1055		78746
LV0016	384317	1143650	6048C	0	145428816	707931476672055	41	-952		78565
LV0017	384151	1143607	5955S	0	138428510	708641479432052	97	-1308		78519
LV0019	384135	1143221	6475S	0	204428496	714241455802052	74	1249		79369
LV0020	384063	1143495	59282	0	132428352	710301480232051	68	-1353		78560
LV0021	384039	1143734	5927S	0	173428298	706851477572051	32	-1593		78365
LV0022	383965	1143634	5924S	0	142428165	708331474812050	24	-1788		78149
LV0023	383932	1143521	5925Y	0	126428109	709991473142049	75	-1897		78020
LV0024	383971	1143376	5951B	0	131428186	712071473402050	32	-1683		78150
LV0025	383961	1143213	6210S	0	146428174	714441469652050	18	395		79360
LV0026	383859	1143238	6104S	0	126428003	714131463422048	82	-1092		78215
LV0027	383856	1143464	5925B	0	120427970	710851469062048	63	-2194		77718
LV0028	383835	1143634	5921B	0	137428017	708371469732049	06	-2207		77735
LV0029	383801	1143607	5922Y	0	127427863	708811463362047	82	-2712		77217
LV0030	383761	1143353	5978S	0	113427799	712511465592047	24	-1902		77822
LV0031	384440	1143933	6432B	0	203429033	703771450232057	22	-162		78104
LV0032	384361	1143800	6217C	0	169428892	705741463862056	06	-707		78257
LV0033	384262	1143792	6135B	0	171428709	705901468202054	60	-900		78347
LV0034	384310	1143999	6471B	0	242428790	702881444362055	31	-191		77981
LV0036	384216	1144090	68292	0	358428613	701601423702053	93	1253		78320
LV0037	384195	1143904	6276C	0	217428581	704311455372053	62	-756		78055
LV0038	384172	1143758	6033C	0	170428544	706441473252053	28	-1222		78371
LV0039	384120	1143852	6129C	0	207428444	705101465472052	52	-1020		78283
LV0040	384062	1143984	6495C	0	297428332	703211433422051	66	-694		77451
LV0042	383968	1144069	6950C	0	461428155	702021415802050	28	1967		78724
LV0043	383974	1143940	6396B	0	282428170	703891451462050	37	308		78775
LV0044	383947	1143792	5949C	0	200428126	706051479892049	97	-1018		78891
LV0045	383822	1143814	5935C	0	193427894	705791476332048	13	-1322		78628
LV0046	383845	1143977	6457	0	282427931	703421449802048	47	906		79165
LV0048	383726	1143994	6262B	0	268427710	703231457412046	72	6		78916
LV0049	383649	1143861	5950B	0	176427572	705191471422045	59	-1418		78464
LV0050	383614	1144082	6414C	0	277427499	702001446892045	08	550		78951
LV0051	383558	114427369649T		0	538427407	699251414682044	40	2584		79367
LV0052	383494	1144102	6330C	0	244427277	701771446402043	31	-114		78540
LV0053	383456	1144010	6121C	0	184427210	703121456952042	75	-971		78336
LV0054	383541	114396260941T		0	181427369	703781461062044	00	-939		78457
LV0055	383563	114375859199T		0	137427417	706731456272044	33	-3089		76856
LV0056	383405	1143752	5918C	0	125427125	706891446542042	01	-3848		76092
LV0057	383401	114389659691T		0	145427112	704801460302041	95	-1987		77800
LV0058	383362	1144041	6185C	0	181427035	702711449072041	37	-1018		78067

LAKE VALLEY GRAVITY DATA

STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	ELEV. +CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
LV0060	383238		1144078		6246C	0	175426804	70223145365203955			196	79068
LV0061	383244		1143904		6012C	0	129426822	70476145672203964			-1709	77915
LV0062	383127		1143895		5967C	0	128426605	70495146161203792			-1472	78304
LV0063	383136		1143990		6075B	0	154426619	70356146193203805			-436	78998
LV0065	383043		1144073		6204C	0	156426444	70240145462203669			184	79180
LV0066	383734		1143738		5928Y	0	148427734	70694146292204684			-2600	77329
LV0067	383562		114363559219T			0	115427420	70851144900204431			-3796	76121
LV0068	383590		114352959340T			0	107427476	71004145241204472			-3383	76485
LV0069	383614		114342159521T			0	106427524	71160145810204508			-2680	77125
LV0070	383634		114331459780T			0	112427565	71314146056204537			-2218	77504
LV0071	383537		1143051		6298S	0	142427396	71701145515204395			396	79057
LV0072	383533		1143205		6085B	0	115427383	71477145850204389			-1269	78092
LV0073	383526		114334159829T			0	103427364	71280145868204378			-2200	77497
LV0074	383448		1143607		5919S	0	108427210	70898144468204264			-4088	75832
LV0075	383418		1143433		5932S	0	103427161	71152145658204220			-2732	77139
LV0076	383414		1143270		6022Y	0	104427160	71389145939204214			-1598	77967
LV0077	383411		1143162		6124S	0	112427159	71546145710204209			-862	78363
LV0078	383293		1143244		5997B	0	103426937	71432145945204036			-1649	78000
LV0079	383322		114337959350T			0	102426986	71235145885204079			-2336	77523
LV0080	383337		1143637		5915Y	0	105427004	70859144090204101			-4341	75590
LV0081	383247		1143737		5819Y	0	148426833	70718144480203968			-4723	75578
LV0082	383270		1143526		5915Y	0	99426884	71024144626204002			-3707	76218
LV0083	383228		114339559229T			0	99426811	71216145361203941			-2835	77062
LV0084	383238		1143098		6069S	0	123426841	71647145841203955			-994	78429
LV0085	383197		1143253		5935Y	0	106426759	71424145730203895			-2307	77556
LV0086	383146		114340559190T			0	96426659	71206145102203820			-3011	76897
LV0087	383123		1143715		5917Y	0	106426605	70756144777203786			-3321	76604
LV0088	383056		114341859170T			0	94426492	71191144885203688			-3115	76798
LV0089	383098		1143259		5931Y	0	101426576	71420145174203750			-2755	77117
LV0090	383102		1143091		5979B	0	124426590	71664145824203755			-1660	78072
LV0091	383452		1142928		6427C	0	151427244	71883144790204270			1011	79242
LV0092	383329		1142927		6298B	0	192427016	71891144724204089			-89	78622
LV0093	382948		1142985		6082S	0	124426309	71826145258203529			-1029	78351
LV0095	382947		1142418		6382S	0	138426330	72650144106203528			645	79016
LV0097	382825		1142448		6514S	0	147426103	72613143660203349			1621	79550
LV0098	382788		1142582		6288E	0	135426029	72420145061203294			949	79637
LV0099	382829		1142789		6218B	0	130426097	72117144677203355			-155	78768
LV0100	382688		1142895		6037S	0	105425832	71970145412203148			-917	78598
LV0101	382714		1142681		6178S	0	122425889	72280145477203186			437	79487
LV0104	382637		1142621		6296S	0	137425749	72371144960203073			1144	79807

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LV0105	382636		1142801		6296S	0	162425739	72109144983203071			1169	79857
LV0106	382576		1142896		6036B	0	103425625	71974145097202983			-1077	78439
LV0107	382570		114274661601T			0	118425620	72193145045202974			48	79156
LV0108	382520		114284160909T			0	108425523	72057144847202901			-727	78606
LV0109	382502		1142711		6228S	0	124425495	72247144336202875			78	78960
LV0110	382502		1142600		6377S	0	146425500	72409143654202875			799	79195
LV0111	382465		114294160371T			0	102425418	71914144683202820			-1319	78192
LV0112	382392		1142841		6100B	0	111425287	72064144585202713			-716	78590
LV0113	382415		1142711		6254S	0	129425334	72252143682202747			-204	78595
LV0115	382278		1142419		6690S	0	170425093	72684140840202546			1261	78614
LV0116	382253		1142615		6377B	0	139425039	72400142853202509			363	78752
LV0117	382270		1142767		6189B	0	119425064	72178143682202534			-602	78408
LV0118	382293		1142880		61212	0	108425102	72012144100202568			-858	78373
LV0119	382340		1142962		6070S	0	101425186	71890144357202637			-1151	78247
LV0120	382779		114236967510T			0	201426022	72730142592203281			2852	80028
LV0121	382967		1143251		5925Y	0	102426334	71438145100203557			-2694	77200
LV0122	382965		1143428		5915U	0	95426323	71181144712203554			-3173	76748
LV0123	382970		1143694		5921Y	0	103426323	70794144749203562			-3087	76821
LV0125	382872		1143426		5917U	0	94426152	71189144494203418			-3235	76678
LV0127	382813		1143297		5926Y	0	96426047	71379144615203331			-2943	76941
LV0128	382782		1143425		5915U	0	94425985	71194144517203286			-3099	76821
LV0129	382727		1143677		5919Y	0	114425874	70831145236203205			-2261	77665
LV0130	382695		1143423		5925U	0	93425824	71202144453203158			-2941	76944
LV0131	382784		1143012		5976Y	0	102426005	71795145624203289			-1420	78299
LV0132	382698		1143117		5955Y	0	95425823	71647144902203148			-2199	77585
LV0133	382592		1143021		5981Y	0	95425649	71792144902203007			-1813	77882
LV0134	382597		1143233		5950Y	0	91425650	71483144363203014			-2651	77146
LV0135	382608		1143422		5929U	0	92425663	71207144539203030			-2690	77180
LV0136	382618		1143631		5921Y	0	109425674	70903145414203045			-1905	78010
LV0137	382501		1143597		5927Y	0	104425459	70958145454202873			-1636	78252
LV0138	382522		1143425		5932U	0	92425504	71207144725202904			-2349	77510
LV0139	382492		1143235		5966Y	0	91425456	71485144234202860			-2476	77267
LV0140	382493		1143133		5983U	0	92425462	71633144371202861			-2180	77505
LV0141	382412		114304160249T			0	96425316	71771144579202743			-1458	78089
LV0142	382414		1143264		5956Y	0	91425311	71447144424202746			-2266	77511
LV0143	382436		1143389		5933U	0	95425346	71264144685202778			-2253	77606
LV0144	382421		1143575		5929Y	0	103425312	70994145313202756			-1641	78240
LV0146	382324		1143584		5936Y	0	104425132	70985145389202613			-1357	78501
LV0147	382346		1143470		5934Y	0	93425177	71150144889202646			-1908	77946
LV0148	382346		1143352		5945Y	0	91425181	71322144727202646			-1966	77848

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LV0149	382362	1143137600697		0	92425219	71634144603202669			-1530	78074
LV0150	382328	1143044 6057Y		0	99425160	71771144729202619			-883	78557
LV0151	382313	1143228598697		0	91425125	71504144361202597			-1889	77782
LV0152	382262	1143319 5963U		0	91425027	71374144446202523			-1954	77798
LV0153	382979	1143884 5998B		0	122426332	70518146686203575			-438	79227
LV0154	382927	1144004 6097C		0	153426231	70346146165203499			50	79408
LV0155	382930	1144103 6220C		0	164426233	70202145257203503			296	79245
LV0157	382794	1144171 6316C		0	212425979	70109144777203303			919	79589
LV0158	382846	1144046 6246B		0	209426080	70288145570203380			977	79883
LV0159	382855	1143932 6056C		0	185426101	70454146520203393			124	79654
LV0160	382849	1143766 5937Y		0	120426096	70695145896203384			-1611	78259
LV0161	382734	1143843 5938C		0	240425880	70589146831203215			-498	79489
LV0166	382377	1143898 6146C		0	183425218	70526146614202691			1768	80989
LV0167	382326	1144027 6445Y		0	206425119	70340144953202616			2997	81221
LV0168	382278	1143787 6048C		0	138425039	70692145970202546			346	79856
LV0169	382172	1143877 6375B		0	235424840	70566144535202391			2145	80637
LV0171	382041	1143836 6407B		0	218424599	70632143833202198			1937	80302
LV0172	381951	1143771624417		0	171424435	70731144516202066			1218	80092
LV0174	382240	1143648595507		0	111424974	70896145699202490			-744	79056
LV0175	382240	1143541595317		0	100424978	71052145135202490			-1327	78469
LV0176	382240	1143432595017		0	93424982	71211144756202490			-1735	78064
LV0177	382237	1143182 6000S		0	92424986	71575144225202486			-1790	77837
LV0178	382241	1143043 6070S		0	102424999	71777144353202492			-1009	78390
LV0179	382148	1143309 5962Y		0	93424817	71394144217202355			-2026	77733
LV0180	382129	1143541 5960Y		0	103424773	71057145148202327			-1086	78689
LV0181	382131	1143697 6023Y		0	126424771	70830145488202330			-156	79427
LV0182	382046	1143676 6075Y		0	122424614	70865144673202206			-355	79046
LV0183	382066	1143431 5957Y		0	94424660	71221144499202235			-1671	78105
LV0184	382103	1143134 6011S		0	96424740	71651143861202289			-1854	77740
LV0185	382030	1143010 6070Y		0	108424610	71836143788202182			-1264	78140
LV0186	382008	1143121602007		0	100424565	71675143830202150			-1661	77906
LV0187	382016	1143266 5969Y		0	93424574	71463144072202162			-1911	77823
LV0188	381999	1143526 5997S		0	105424533	71085144303202137			-1392	78259
LV0189	381910	1143637616217		0	142424364	70928144232202006			221	79346
LV0190	381958	1143398 5965Y		0	96424462	71274144345202077			-1590	78161
LV0191	381929	1143164 6000S		0	100424417	71616144127202034			-1437	78199
LV0192	381895	1143314 5966Y		0	98424349	71399144248201984			-1586	78164
LV0193	381834	1143494 6040S		0	106424229	71140144437201895			-611	78894
LV0194	381861	1143237 5979S		0	99424289	71513143930201935			-1732	77974
LV0195	381820	1143095 6072S		0	109424218	71722143306201874			-1420	77979

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LV0196	38	1797	114	3370	5890S	0	119424165	713231441	17201841		-2289	77741
LV0197	38	1761	114	3277	5978Y	0	100424102	714601439	59201788		-1566	78145
LV0198	38	1715	114	3132	6056Y	0	106424023	716741433	67201720		-1356	78094
LV0199	38	1666	114	3315	6012S	0	100423925	714091437	05201649		-1361	78234
LV0200	38	1721	114	3426	6059S	0	102424023	712451436	66201729		-1037	78399
LV0202	38	1574	114	3557	6235 9T	0	116423746	710611432	41201514		420	79266
LV0203	38	1596	114	3431	6100S	0	104423791	712431433	20201546		-814	78485
LV0204	38	1547	114	3314	5998S	0	101423705	714161437	50201474		-1272	78371
LV0205	38	1595	114	3179	6015S	0	105423799	716111435	40201545		-1393	78196
LV0206	38	1597	114	3013	6162S	0	119423809	718531426	97201548		-855	78247
LV0207	38	2130	114	2989	6094B	0	109424796	718611437	25202329		-1248	78076
LV0208	38	2190	114	2883	6153B	0	113424911	720131433	01202417		-1205	77922
LV0209	38	2187	114	2513	6448C	0	149424921	725521418	88202413		165	78321
LV0210	38	2187	114	2328	66571T	0	183424928	728211411	82202413		1426	78904
LV0211	38	2110	114	2579	6341C	0	139424775	724601425	96202300		-23	78489
LV0212	38	2144	114	2717	6264B	0	124424833	722571429	55202350		-438	78321
LV0213	38	2063	114	2830	6197C	0	121424678	720961434	61202231		-445	78540
LV0214	38	1907	114	2989	6110C	0	121424384	718721436	29202002		-867	78414
LV0216	38	2005	114	2634	6460B	0	146424579	723851420	07202146		663	78776
LV0217	38	2016	114	2481	6516S	0	165424606	726071415	36202162		703	78644
LV0220	38	1848	114	2828	6369B	0	161424281	721101424	16201915		445	78883
LV0221	38	1761	114	2826	6370C	0	156424120	721171423	91201788		558	78987
LV0222	38	1734	114	2989	6179S	0	126424064	718811427	06201748		-887	78164
LV0223	38	1595	114	2826	64242	0	159423813	721261418	71201545		789	79038
LV0225	38	1529	114	2664	6746C	0	228423697	723651397	67201448		1814	79034
LV0226	38	1472	114	2789	6456D	0	168423587	721861407	70201364		170	78319
LV0228	38	1364	114	2944	6200C	0	137423381	719651420	07201206		-846	78145
LV0229	38	1350	114	2785	63681T	0	168423361	721981409	51201186		-299	78150
LV0231	38	1257	114	2631	6614B	0	226423196	724271397	24201049		926	78594
LV0232	38	1267	114	2782	63310T	0	162423208	722071409	75201064		-502	78067
LV0233	38	1246	114	2898	6158B	0	139423165	720381415	62201033		-1513	77623
LV0234	38	1161	114	2968	6034C	0	123423005	719401418	68200909		-2250	77293
LV0235	38	1179	114	2779	62529T	0	155423045	722151409	03200935		-1180	77648
LV0237	38	1102	114	2601	6478B	0	178422910	724791398	72200822		21	78105
LV0238	38	1092	114	2775	61870T	0	144422885	722261411	07200808		-1470	77572
LV0239	38	1045	114	2876	6054B	0	128422794	720811415	20200739		-2240	77239
LV0240	38	1004	114	2772	61640T	0	134422722	722351410	44200679		-1620	77490
LV0241	38	973	114	2593	6316B	0	163422709	724961405	78200663		-639	77982
LV0243	38	939	114	2459	6382C	0	190422614	726951405	07200584		-9	78413
LV0244	38	926	114	2768	61119T	0	127422578	722441414	40200565		-1599	77681

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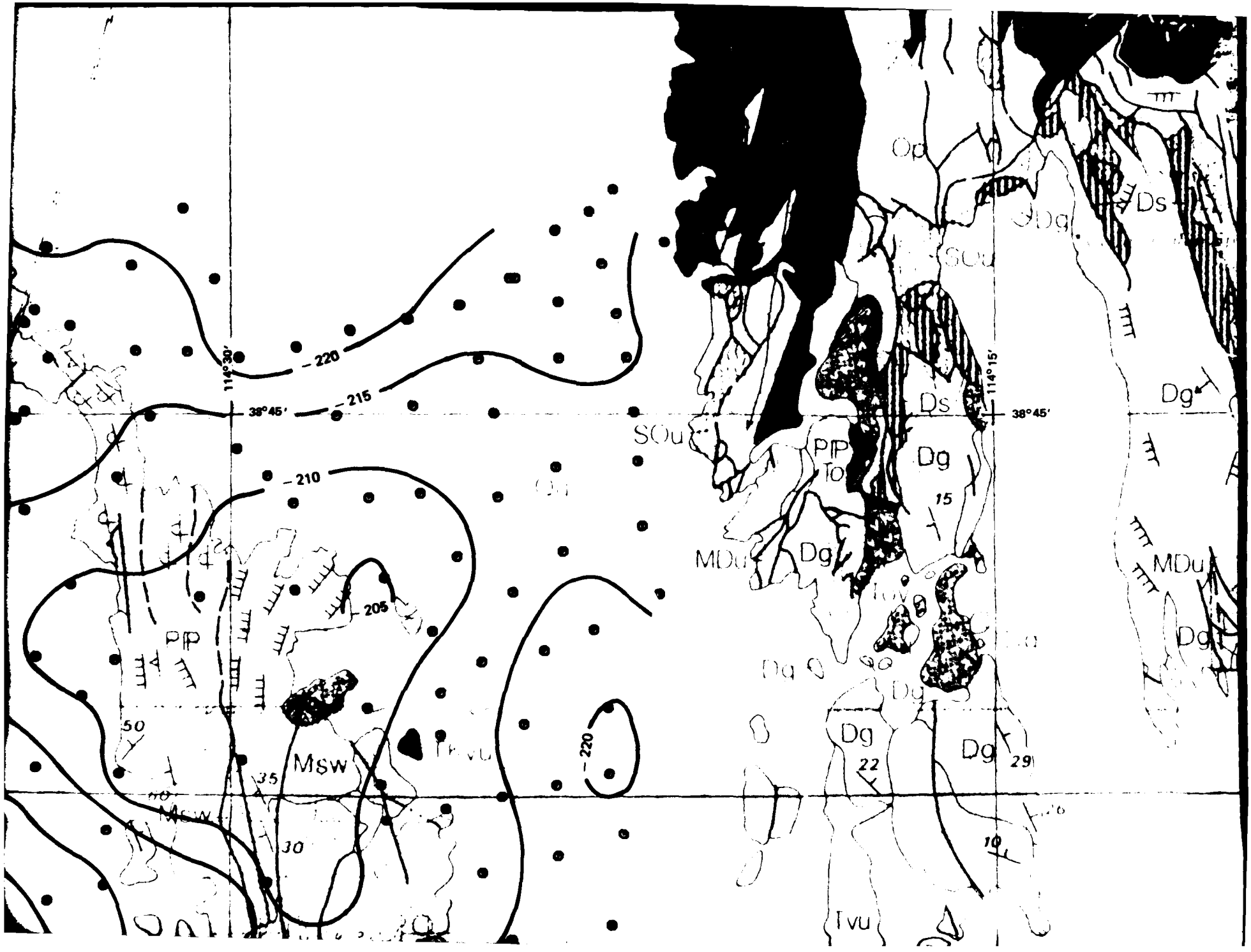
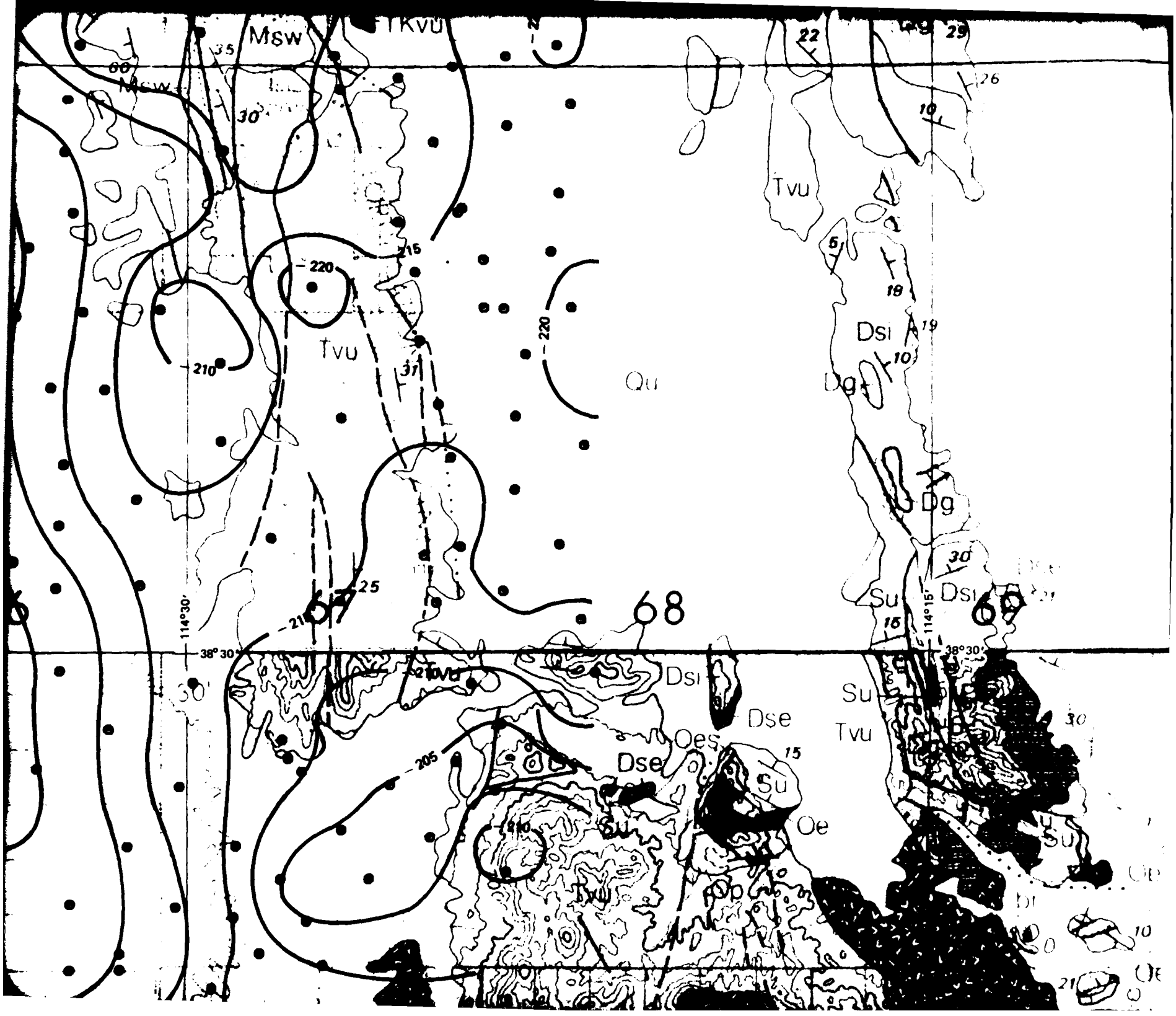
LV0245	38	905	1142930		5974Y	0	113422533	72009142171200534		-2137	77600
LV0246	38	806	1142911		5929B	0	110422350	72041142826200389		-1761	78127
LV0247	38	929	114276560380T			0	121422399	72254141977200423		-1617	77910
LV0248	38	876	1142607		6181C	0	140422492	72482141314200491		-1003	78056
LV0249	38	832	1142447		6251C	0	176422417	72718141106200427		-487	78369
LV0250	38	756	1142660		6029S	0	124422268	72411142073200316		-1499	78061
LV0252	381467		1143257		5934Y	0	112423559	71504143850201357		-1658	78215
LV0253	381460		1143425		6070S	0	108423540	71259143551201347		-667	78738
LV0254	381460		1143550		6190S	0	117423535	71076143556201347		468	79473
LV0255	381319		1143399		6005Y	0	106423280	71304143578201140		-1044	78580
LV0256	381339		1143259		5980S	0	103423322	71507143678201169		-1210	78497
LV0257	381350		1143106		6046Y	0	112423349	71730142684201186		-1598	77892
LV0258	381265		1143050		6044Y	0	116423194	71816142378201061		-1799	77703
LV0259	381251		1143144		5970S	0	110423164	71679142916201041		-1936	77812
LV0260	381238		1143256		5868Y	0	118423136	71516143708201022		-2086	78018
LV0261	381219		1143405		5925Y	0	111423095	71300143660200994		-1570	78333
LV0263	381070		1143410		5890S	0	105422819	71300143423200775		-1918	78098
LV0264	381108		1143269		5810S	0	112422895	71504143638200831		-2512	77784
LV0265	381147		1143135		5910S	0	111422972	71697142779200888		-2486	77468
LV0266	381026		1143009		5933S	0	115422753	71887142063200711		-2809	77071
LV0267	381034		1143163		5871S	0	104422762	71662142631200723		-2836	77244
LV0268	38	960	1143309		5808Y	0	110422619	71452143662200614		-2290	78011
LV0269	38	942	1143111		5855S	0	108422594	71743142692200588		-2791	77347
LV0270	38	849	1143418		5856C	0	107422410	71299144619200452		-718	79416
LV0271	38	846	1143224		5725B	0	112422412	71582144208200448		-2359	78227
LV0272	38	829	1143059		5868S	0	110422387	71824143002200423		-2193	77903
LV0273	38	773	1143255		5710S	0	118422276	71541144936200341		-1664	78979
LV0274	38	754	1143112		5800S	0	107422246	71750143549200313		-2176	78149
LV0275	38	729	1143372		5821C	0	116422190	71372144321200276		-1170	79092
LV0276	38	638	1143414		5806C	0	152422020	71315144767200143		-732	79617
LV0277	38	644	1143271		5683C	0	126422036	71523145289200152		-1377	79366
LV0278	38	673	1143061		5777C	0	108422098	71829143621200194		-2203	78202
LV0279	38	590	1143114		5738C	0	113421943	71756143916200073		-2153	78390
LV0280	38	503	1143169		5651S	0	133421780	71679144808199946		-1953	78906
LV0281	38	527	1143364		5869C	0	184421816	71393144502199981		-242	79925
LV0283	38	716	1142895		5902S	0	107422184	72069142904200257		-1805	78172
LV0284	38	742	114276259741T			0	115422238	72262142343200295		-1726	78013
LV0285	38	739	114254860761T			0	136422241	72575141915200291		-1190	78223
LV0286	38	733	114237263140T			0	171422237	72833140653200282		-202	78434
LV0287	38	662	1142265		6350S	0	179422110	72993140525200178		113	78634

LAKE VALLEY GRAVITY DATA

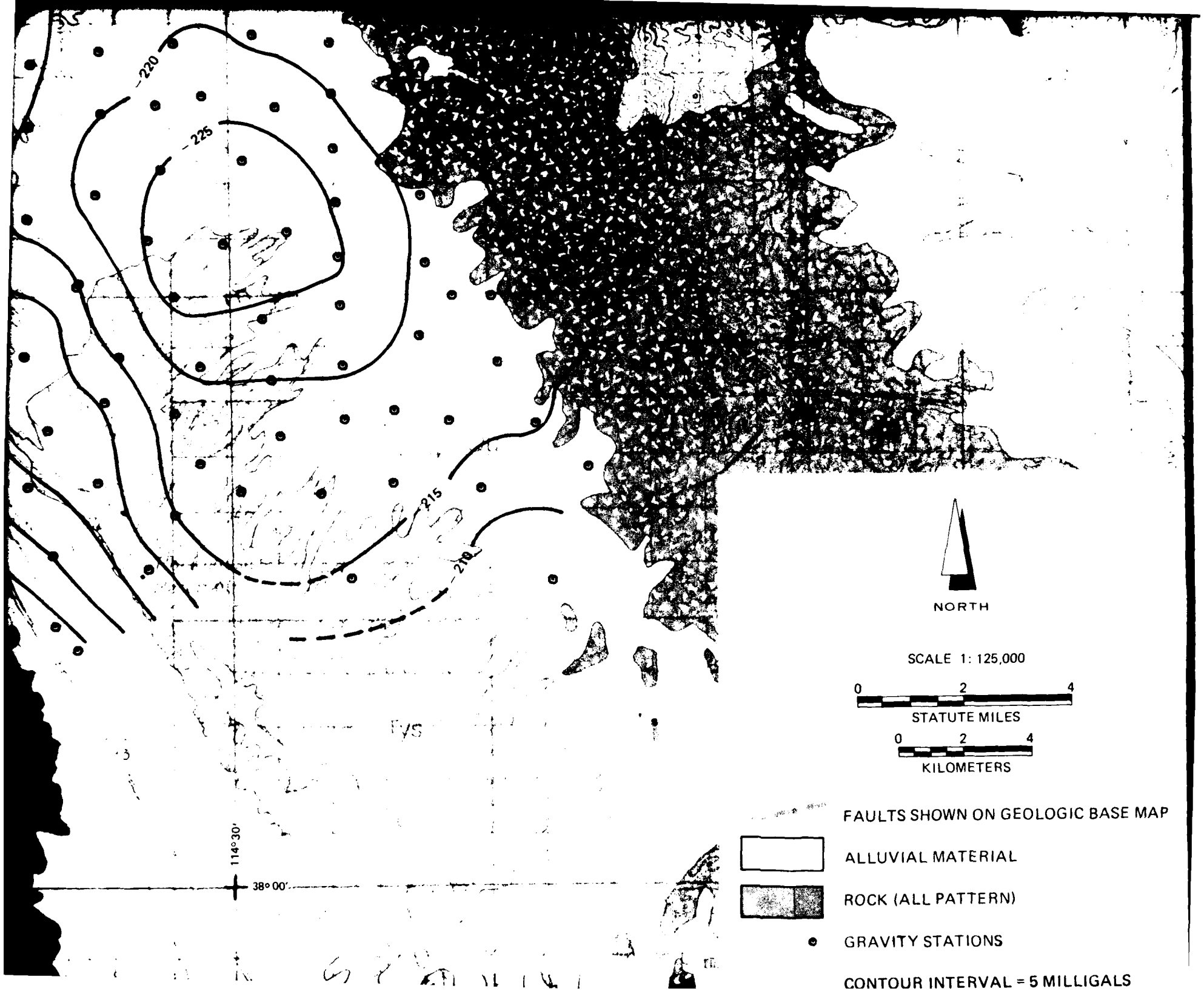
STATION IDENT.	LAT. DEG	MIN	LONG. DEG	MIN	ELEV. +CODE	TER-COR. IN/OUT	NORTH UTM	EAST UTM	OBSV GRAV	THEO GRAV	FAA	CBA +1000
LV0288	38	629	1142484		6025B	0	135422040	72674142663200130			-761	78825
LV0289	38	639	1142664		5950S	0	116422051	72411142448200145			-1697	78125
LV0290	38	622	1142812		5855S	0	109422014	72195143114200120			-1901	78239
LV0291	38	627	1142979		5829S	0	104422016	71951143370200127			-1897	78326
LV0295	381460		1143103		6064Y	0	113423552	71729142992201347			-1282	78149
LV0296	382327		1143716		5957Y	0	120425132	70793146043202618			-510	79293
SPR136	383596		1142536		6283B	0	188427526	72445145002204481			-345	78414
SPR144	383369		1142334		6104S	0	123427114	72750145591204148			-1107	78197
SPR167	383467		114231460679T			0	117427296	72774145817204292			-1365	78056

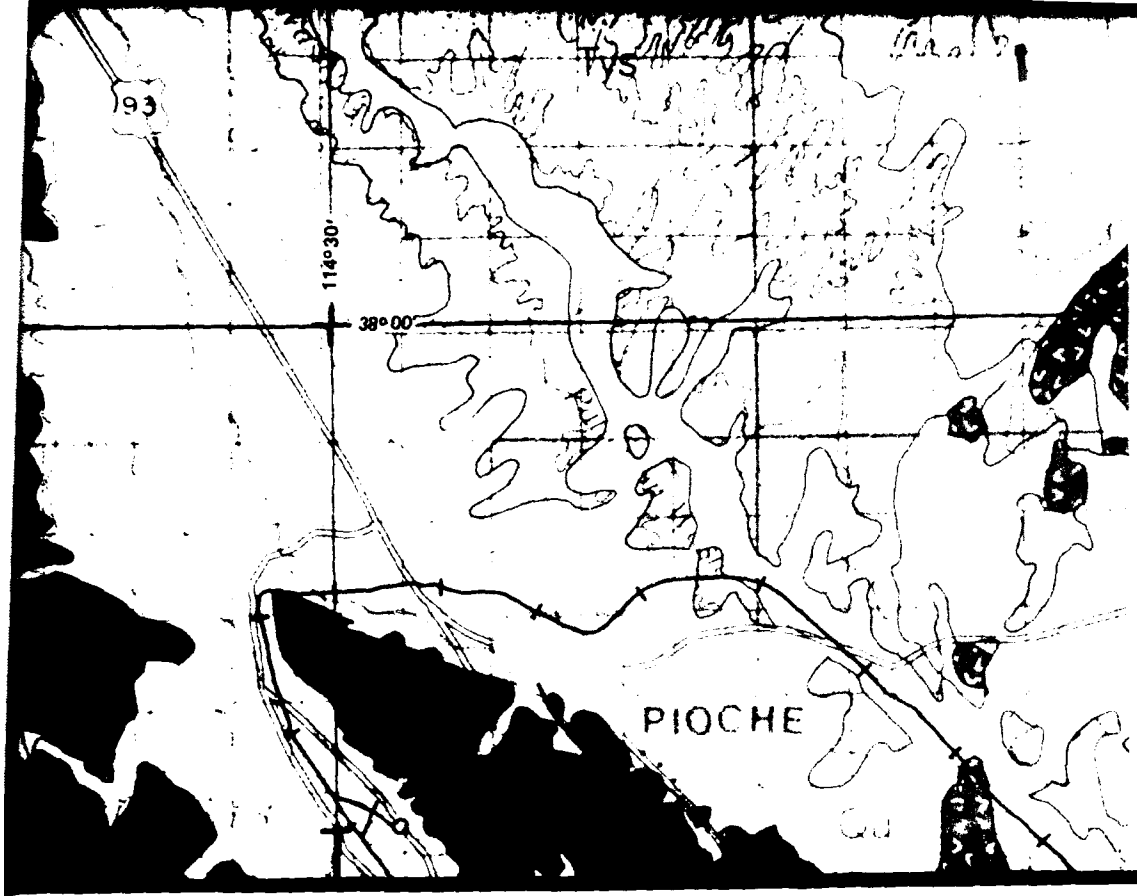
END OF LIST


114°30'
38°45'
114°15'
38°45'
-220
-215
-210
-205
-220
Op
Ds
SOu
Dg
PP
To
MDu
Msw
Tvu
15
22
29
10
30
35
50


Msw
TKvu
Tvu
Qu
Dsl
Dg
Su
Dse
Oes
Oe
68
69
114°30'
114°15'
38°30'
220
210
205
215
25

38°15'
114°15'
114°30'
220
220
220
220


220
225
215
210
Tys
114°30'
38°00'
NORTH
SCALE 1: 125,000
0 2 4
STATUTE MILES
0 2 4
KILOMETERS
FAULTS SHOWN ON GEOLOGIC BASE MAP
ALLUVIAL MATERIAL
ROCK (ALL PATTERN)
GRAVITY STATIONS
CONTOUR INTERVAL = 5 MILLIGALS



STATUTE MILES
0 2 4
KILOMETERS

FAULTS SHOWN ON GEOLOGIC BASE MAP

ALLUVIAL MATERIAL

ROCK (ALL PATTERN)

GRAVITY STATIONS

CONTOUR INTERVAL = 5 MILLIGALS

GEOLOGIC BASE MAP: Howard (1978)

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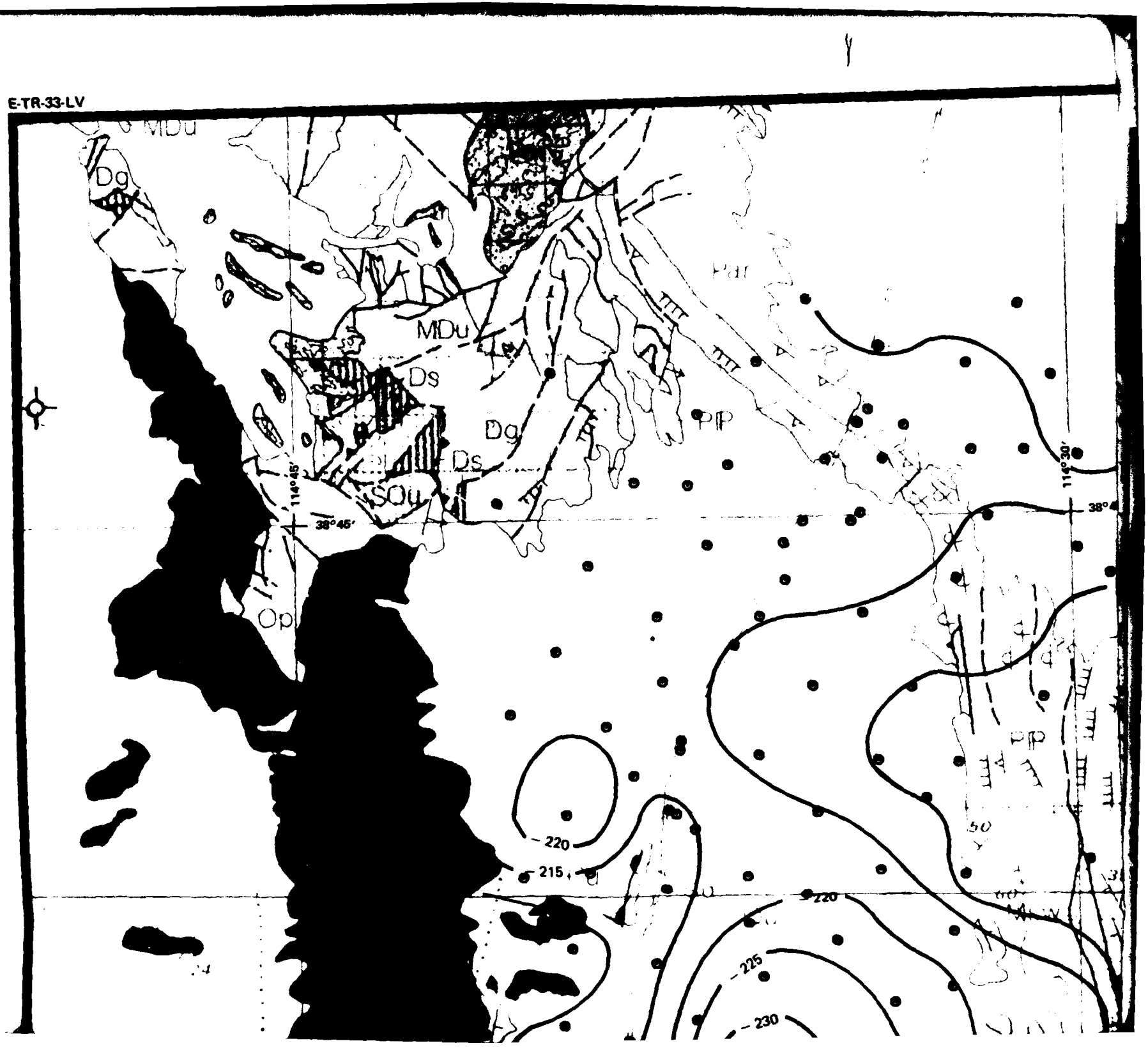
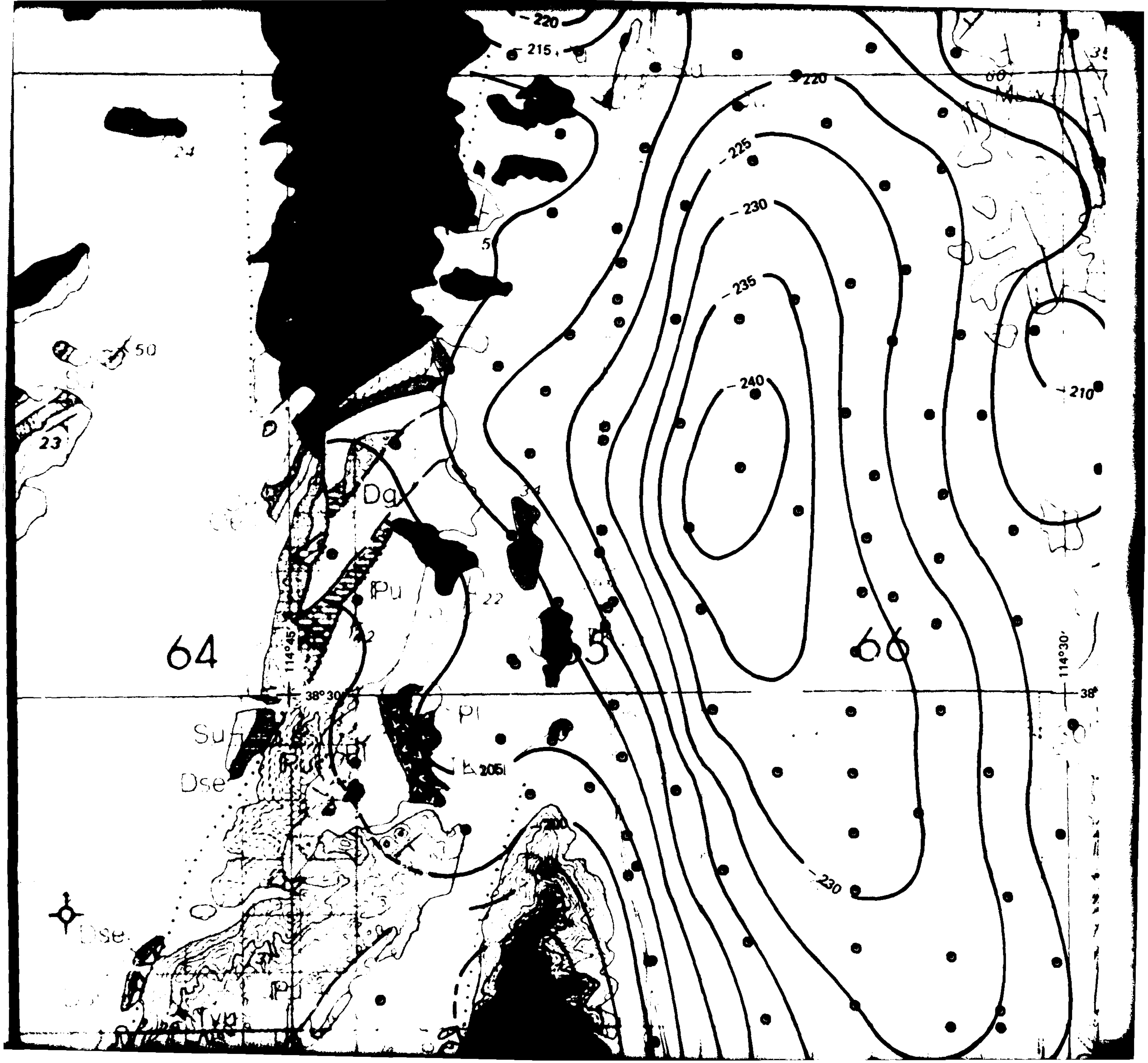
COMPLETE BOUGUER
ANOMALY CONTOURS
LAKE VALLEY, NEVADA

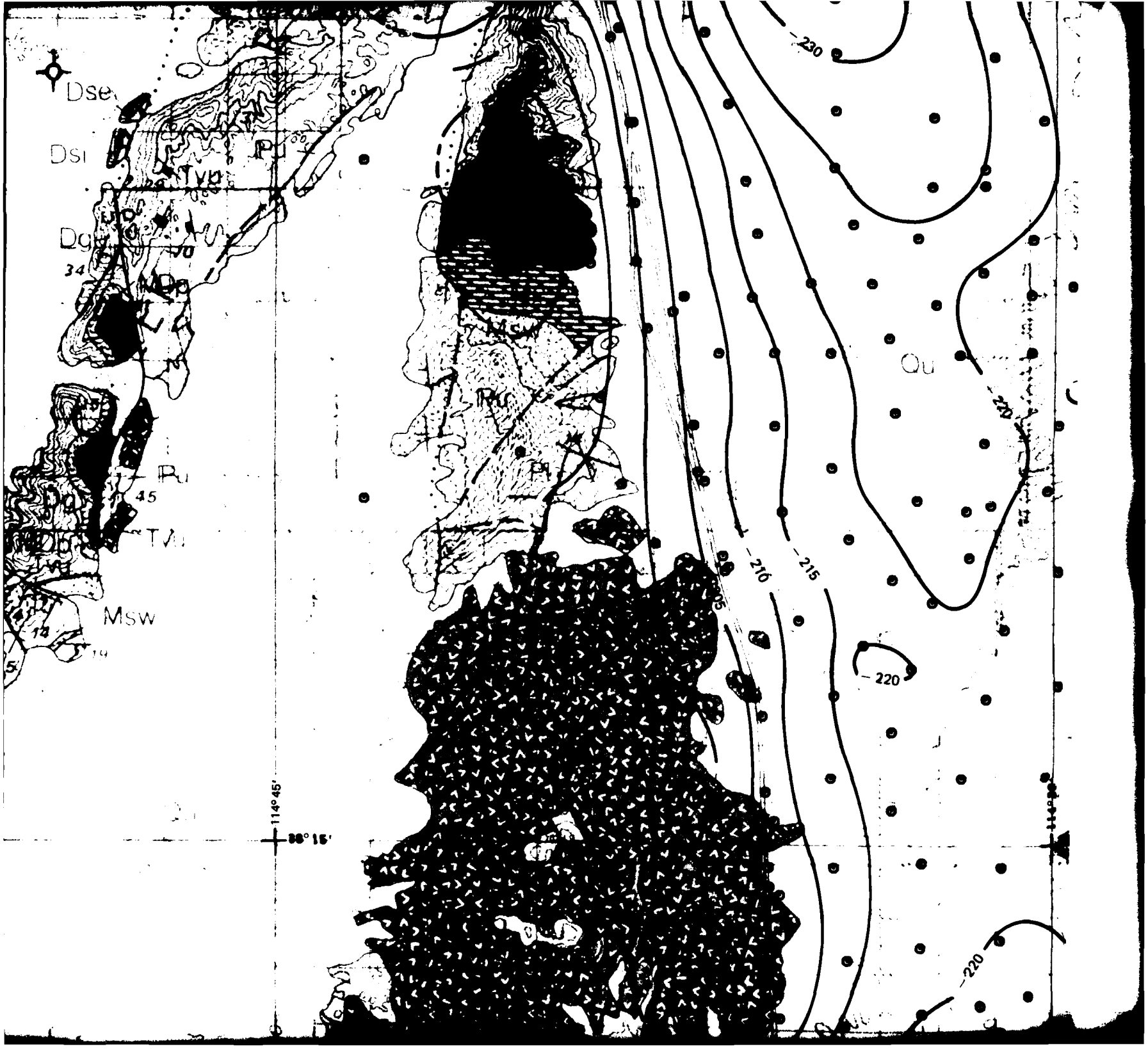
20 MAY 81

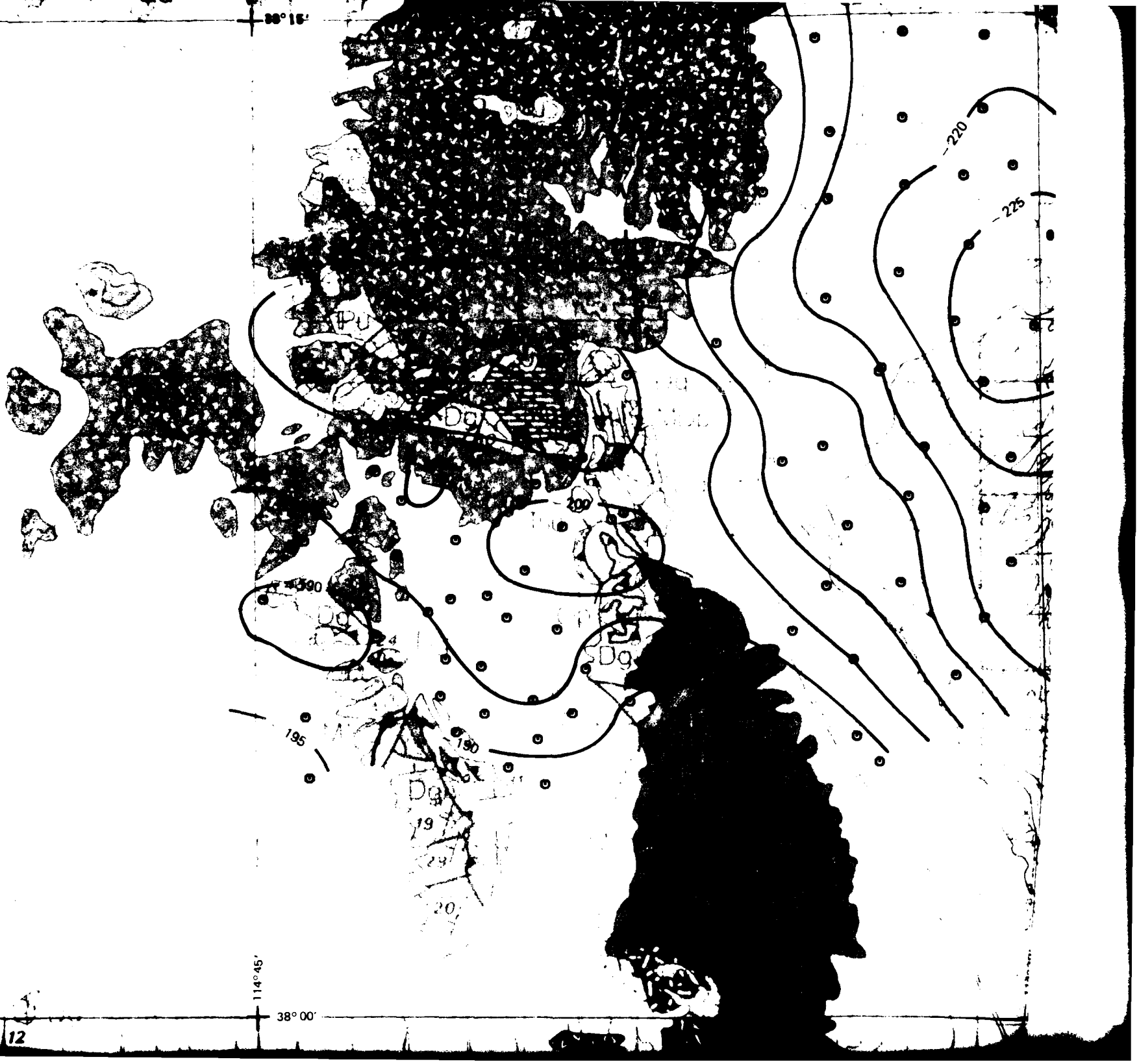
DRAWING 1

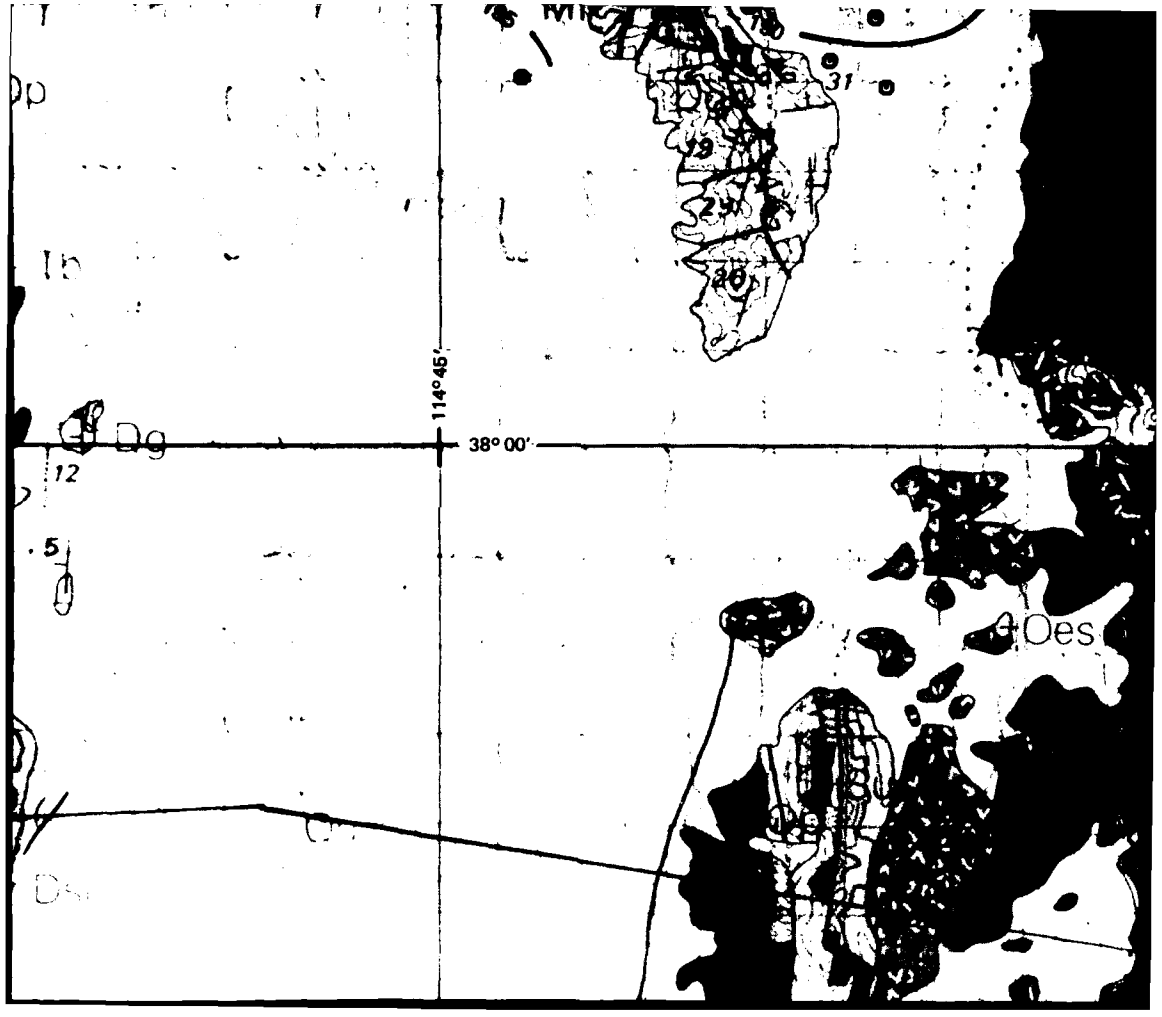

E-TR-33-LV
MDu
Dg
MDu
Ds
Dg
Ds
SOu
Op
Par
PP
114°45'
38°45'
114°30'
38°4
220
215
220
225
230
50

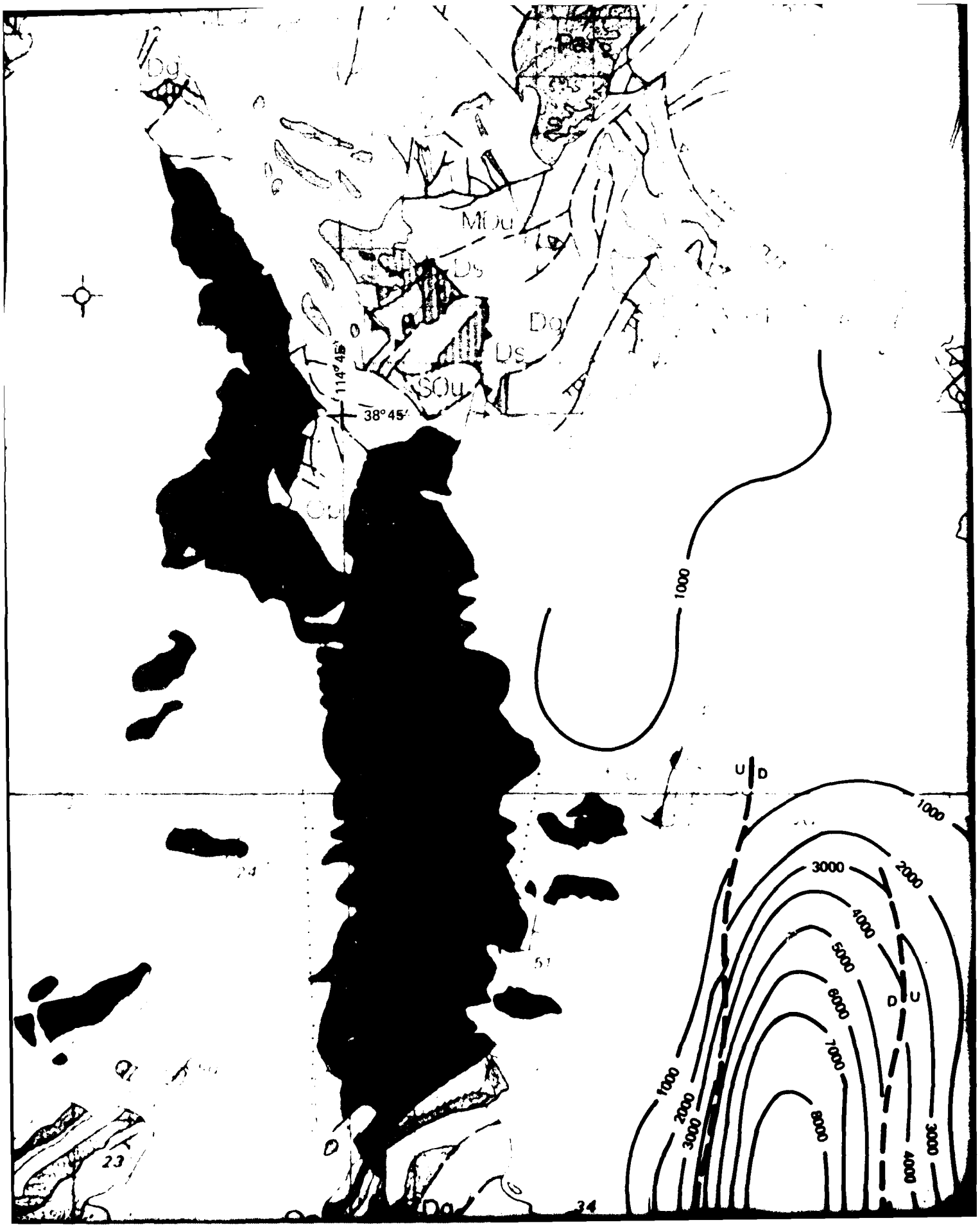


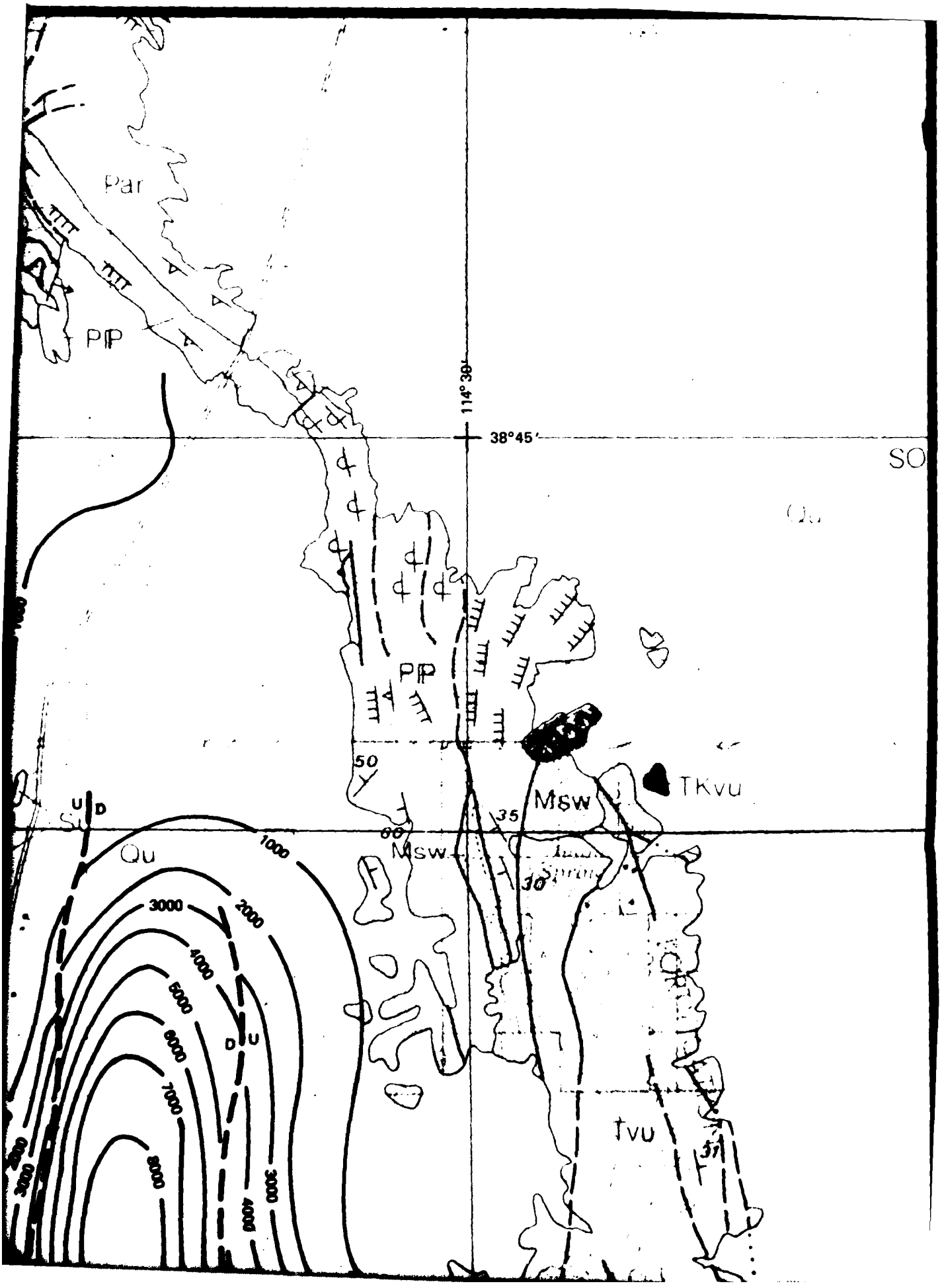
64
66
114°30'
38°
114°45'
38°30'
210
215
220
225
230
235
240
Pl
Pu
Dq
Su
Dse

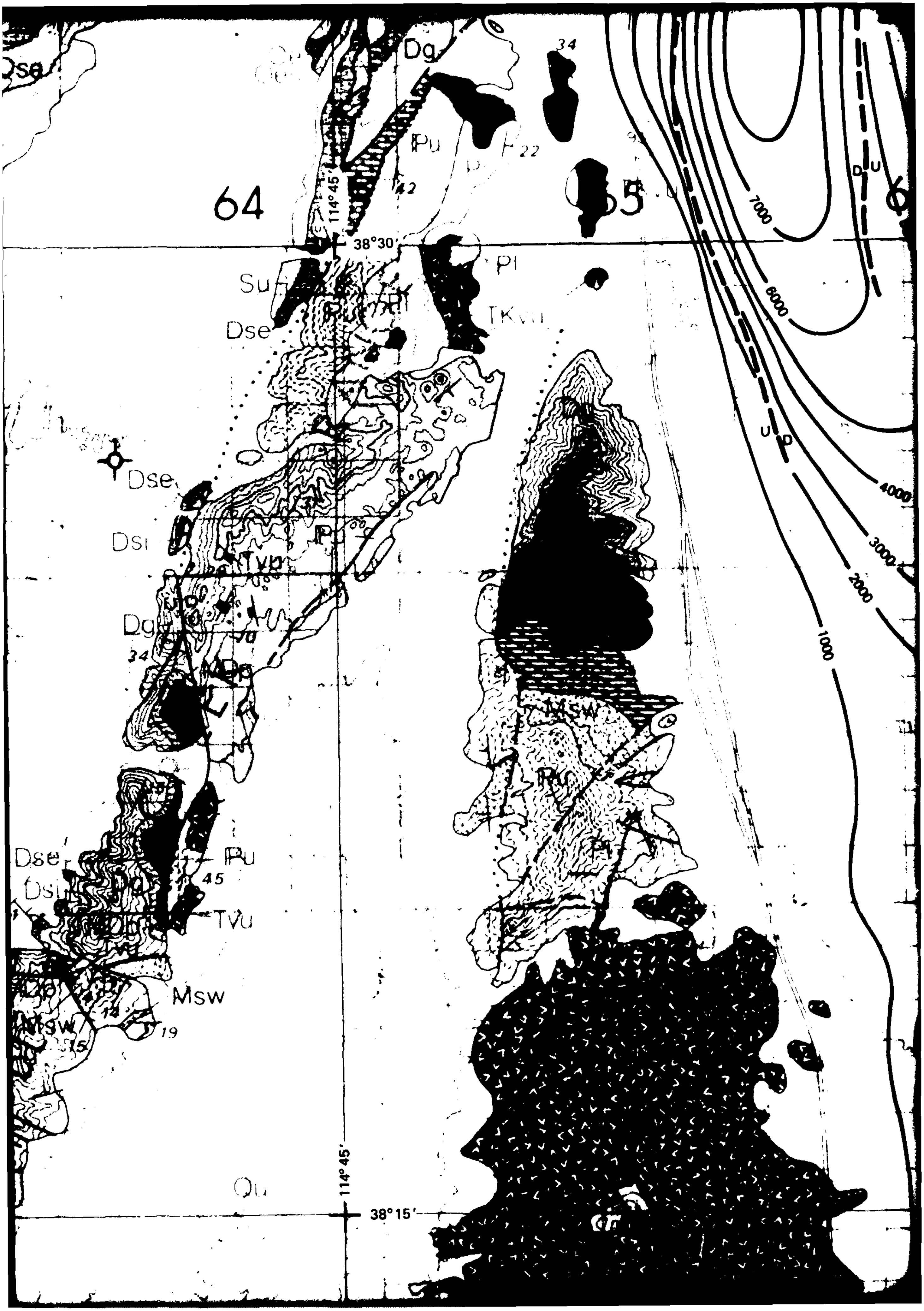

Dse
Dsl
Tvd
Dgl
34
Dd
Pu
45
Tvl
Msw
12
5
Qu
Pu
Pl
230
220
215
210
205
220
220
114°45'
38°15'


38° 15'
220
225
200
190
195
Dg
Pu
114° 45'
38° 00'
12


114°45'
38° 00'
Dg
Oes
12
5
31
19
30

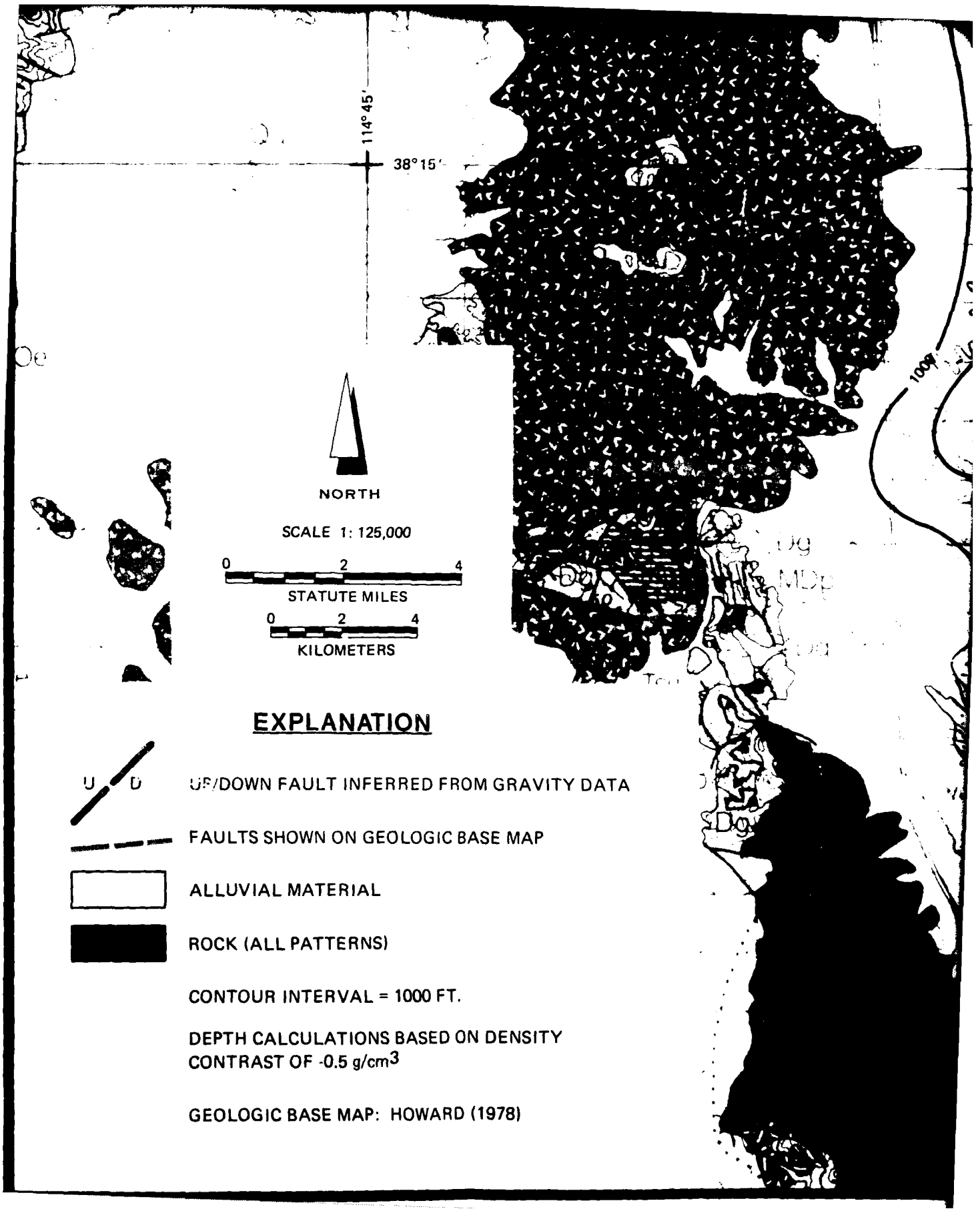

Perry
Mou
Us
Dg
Us
SOu
114°45'
38°45'
1000
U
D
1000
3000
2000
4000
5000
6000
7000
8000
1000
2000
3000
3000
4000
24
23
34

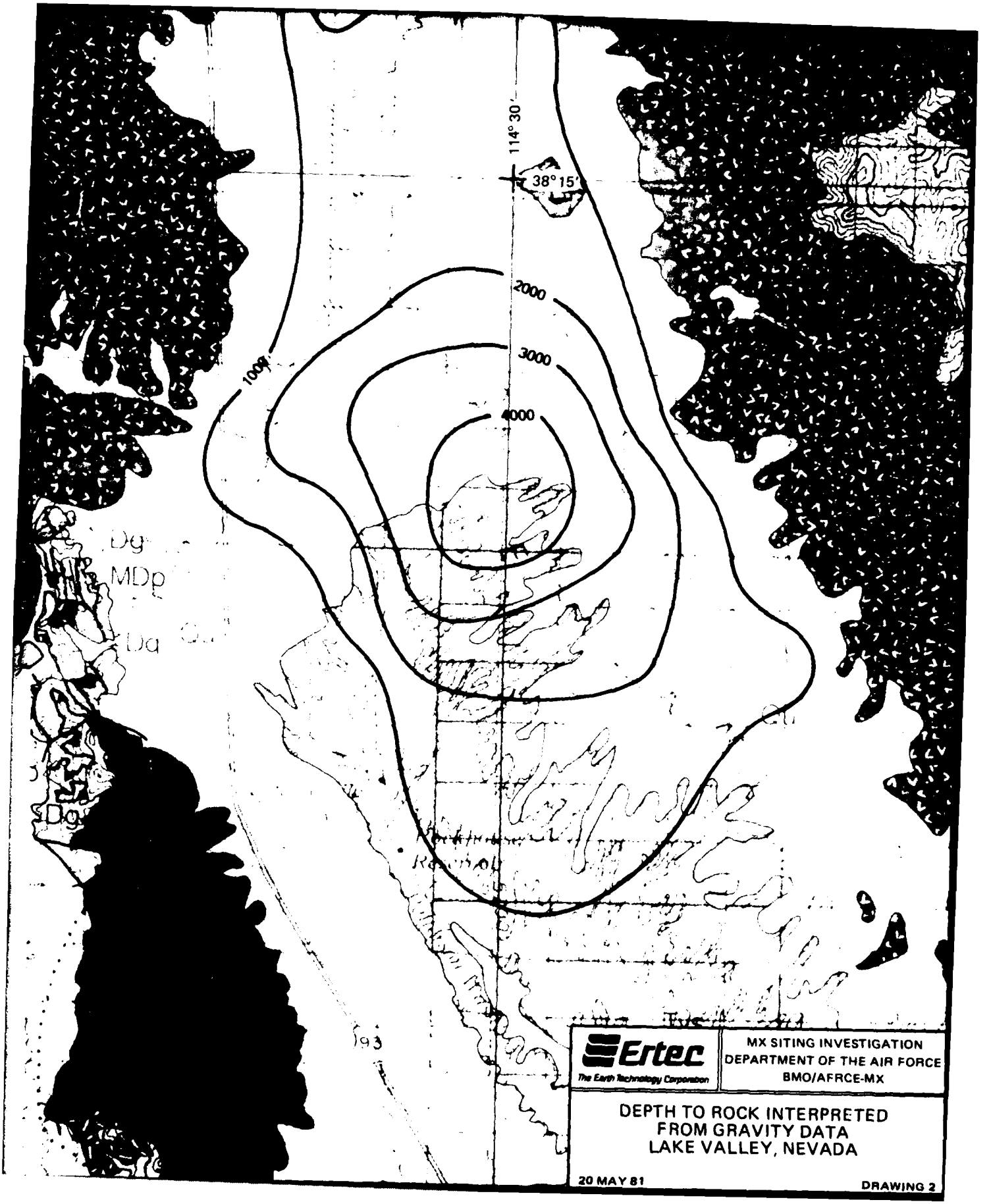

Par
PIP
114°30'
38°45'
SO
PIP
50
TKvu
Msw
35
Msw
30
Qu
1000
3000
2000
4000
5000
6000
7000
8000
U
D
Tvu
31



Dse
Dg
34
IPu
22
42
64
65
114°45'
38°30'
7000
6000
Pl
Su
TKvu
Dse
Dse
Dsi
Tvu
Dg
34
Msw
Dse
IPu
45
Dsi
TVu
Msw
Msw
19
15
4000
3000
2000
1000
Qu
114°45'
38°15'

66
67
25
114°30'
38°30'
38°15'
7000
6000
5000
4000
3000
2000
1000
TW


114° 45'
38° 15'
NORTH
SCALE 1: 125,000
0 2 4
STATUTE MILES
0 2 4
KILOMETERS
EXPLANATION
U D
UP/DOWN FAULT INFERRED FROM GRAVITY DATA
FAULTS SHOWN ON GEOLOGIC BASE MAP
ALLUVIAL MATERIAL
ROCK (ALL PATTERNS)
CONTOUR INTERVAL = 1000 FT.
DEPTH CALCULATIONS BASED ON DENSITY CONTRAST OF -0.5 g/cm3
GEOLOGIC BASE MAP: HOWARD (1978)



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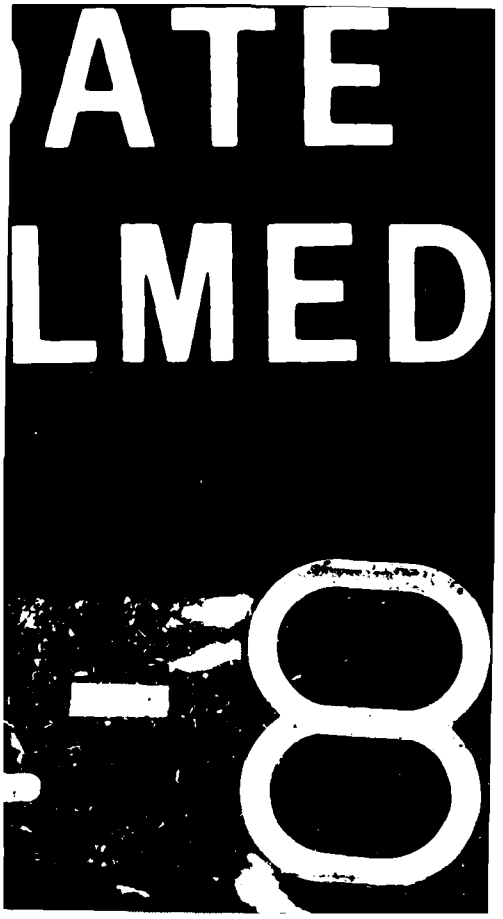
BMO/AFRCE-MX

DEPTH TO ROCK INTERPRETED
FROM GRAVITY DATA
LAKE VALLEY, NEVADA

20 MAY 81

DRAWING 2


ATE
LMED
8